DOCUMENT RESUME

ED 158 084	08	CE 017 562

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TITLE	Multiple Learning Strategies Project. Building Maintenance & Engineering. Regular Vocational. [Vol. 2.]
INSTITUTION	Ingham Intermediate School District, Mason, Mich. Capital Area Career Center.
SPONS AGENCY	Bureau of Occupational and Adult Education (DHEW/OE), Washington, D.C.
BUREAU NO	498AH60038
PUB DATE	19 Dec 76
GRANT	G007603808
NOTE	336p.; For related documents see CE 017 554-583
EDRS PRICE	MF-$0.83 HC-$18.07 Plus Postage.
DESCRIPTORS	Buildings; Cleaning; *Learning Activities; Learning Modules; *Maintenance; *Vocational Education

ABSTRACT

This instructional package is one of two designed for regular vocational students in the vocational area of building maintenance and engineering. The fifty-three learning modules are organized into ten units: office cleaning; grounds; sanitation; boiler maintenance and operation; power and hand tools; cabinet construction; repair of damaged furniture; windows; door maintenance; and increased production speed. Each module includes these elements: a performance objective page telling what will be learned, what materials will be needed, and how the student will be evaluated; a section presenting information needed to perform the activity; and job step pages which detail steps (visuals included) necessary to do the tasks. (This document and CE 017 561 are one of four sets of learning modules on building maintenance and engineering. The other three sets are written in formats designed for low reader, educable mentally impaired, and visually impaired students. The modules are part of a total set of over 1,300 written for different student populations. Graphics, dietetic assistant, small engine repair, and medical assistant are the other vocational areas covered.) (JH)

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ED158084

CAPITAL AREA CAREER CENTER
Ingham Intermediate School District
611 Hagadorn Road
Mason, Michigan 48854

TO:

MULTIPLE LEARNING STRATEGIES PROJECT

BUILDING MAINTENANCE & ENGINEERING
Regular Vocational

[VOL. 2]

CE 017 562

U.S. DEPARTMENT OF HEALTH,
EDUCATION & WELFARE
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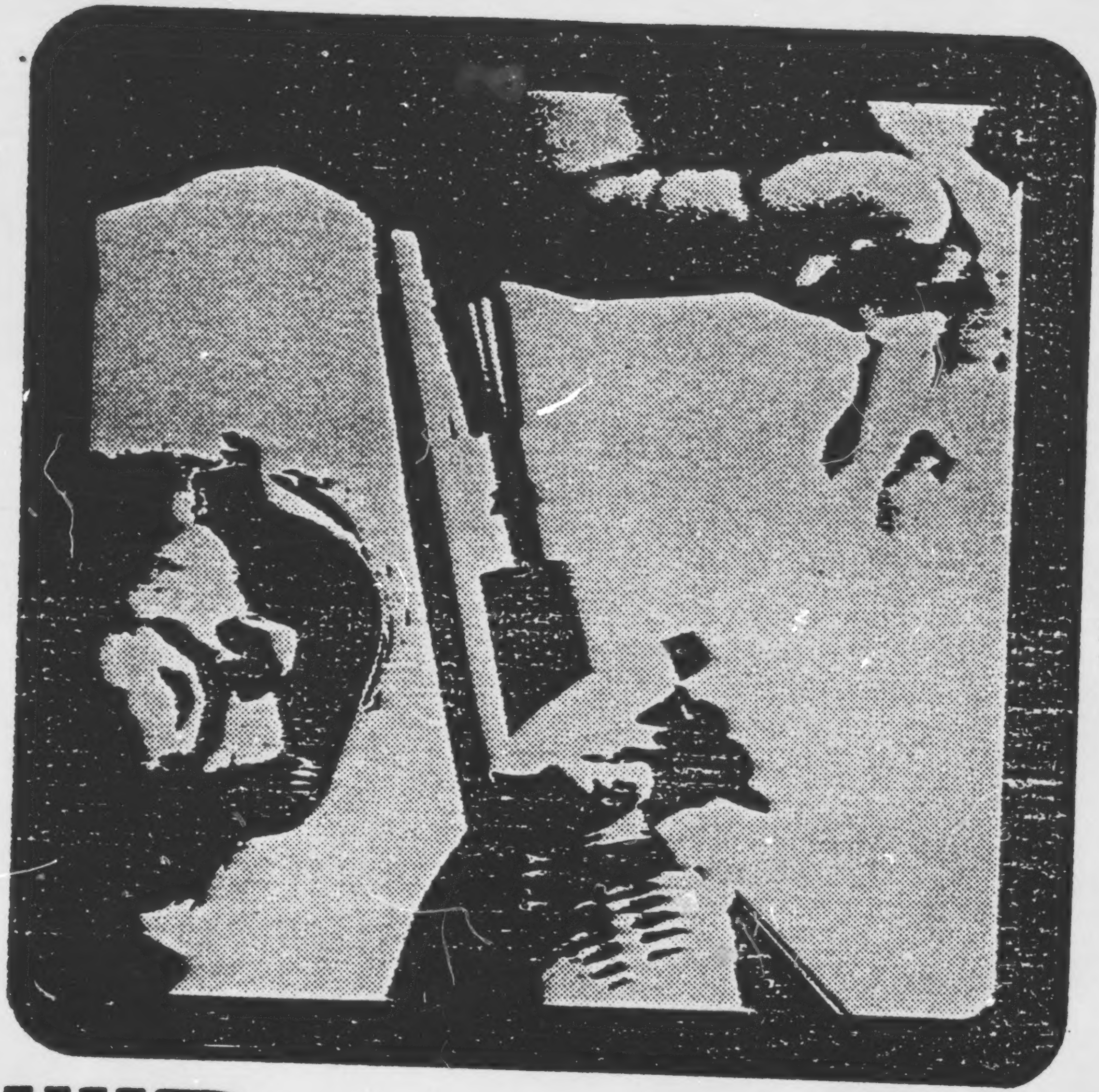


building maintenance & engineering

unit: Office Cleaning

capital area career center

module: 2201 06 1 **date:** 12-19-76 **level:** 1

skill title: Dusting

developed & written by: Dwight Smith

visuals by: Sandra Starnaman

PERFORMANCE OBJECTIVE

You are going to learn:

How to dust.

And in order to do this you will need:

wiping cloths	glass cleaner
a hand duster	a vacuum sweeper
dusting solution	

We will know that you can do it when:

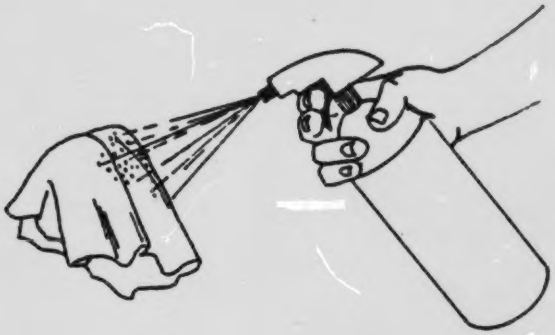
You have removed the dust from an assigned area.

INFORMATION	MATERIALS	LOCATION OF MATERIALS
The best time to dust is the first thing in the morning or late at night. This makes sure that the dust will settle before the area is used.		

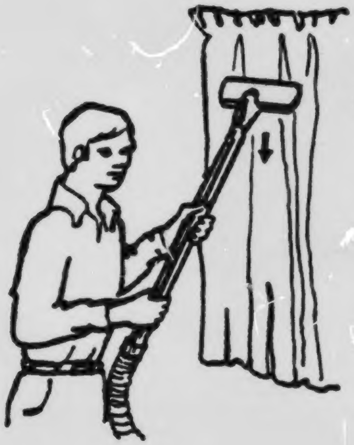
JOB STEPS

1. Gather your equipment.

2. If possible, spray dusting solution on your wiping cloths. This helps to keep dust from flying in the air.

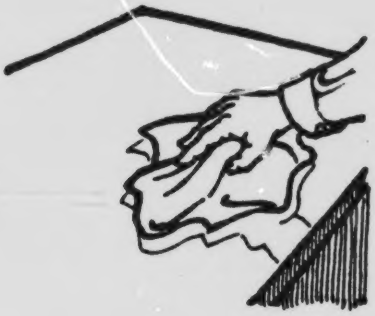


3. Use the vacuum cleaner to dust curtains. If no vacuum cleaner is available, brush the curtains with a bench brush. Always start at the top.



JOB STEPS

4. Use your wiping cloths to dust all areas that collect dust. Begin in one corner of the work area and work around the area until you are at the place where you started.



5. Always start at the top and dust high places first.

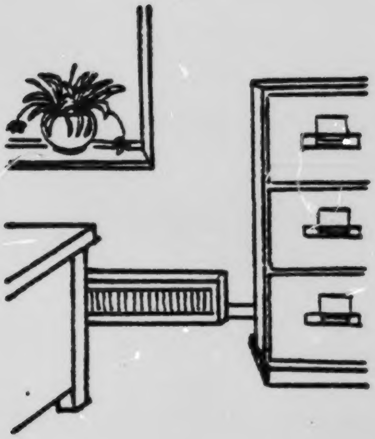
6. Some of the things you must dust are:

   desks
   tables
   picture frames
   chairs
   file cabinets
   ledges
   window sills
   hand rails
   furniture
   door jams

   pipes
   radiators
   registers
   chalk channels
   maps
   clocks
   lights
   fans
   ceilings and walls

JOB STEPS

7. When done, return all equipment. Do not leave any equipment in your work area.



Practice Exercise

8. Look at the room you are in. Do you see things that must be dusted? Write them on a slip of paper and show the paper to your instructor.

Practice Exercise

7. Look at the room you are in. Do you see things that must be dusted? Write them on a slip of paper and show the paper to your instructor.

building maintenance & engineering

unit: Office Cleaning

capital area career center

module: 2201 06 002 date: 12/19/76 level: 1

skill title: Cleaning Desktops

developed & written by: Dwight Smith

visuals by: Marie Gougeon and Sandy Starnaman

PERFORMANCE OBJECTIVE

You are going to learn:

How to clean a desk top.

And in order to do this you will need:

wiping cloths
glass cleaner
furniture polish
a spray bottle

We will know that you can do it when:

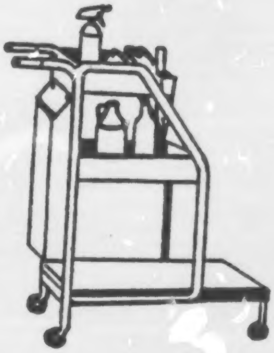
You have cleaned a desk top so that it has no fingerprints, dust, or streaks on it.

INFORMATION	MATERIALS	LOCATION OF MATERIALS
Remember that you must clean an office without changing the papers or equipment on the desk. Also be careful not to leave any cleaning equipment in the office.		

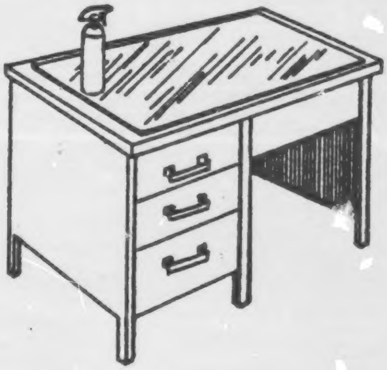
JOB STEPS

1. Gather your equipment. Use your checklist to be sure you have all the items.

2. Use a cart or carrier for your equipment, if one is available.



3. If the desk has a wood top, turn to job step 7. If the desk has a glass top, spray a small amount of glass cleaner on the uncovered areas.

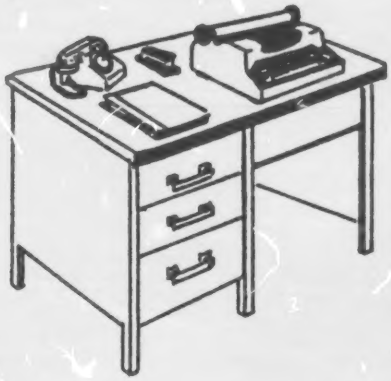


4. With wiping cloth, wipe clean all uncovered areas.

WORD GUIDE

FORMICA - A hard plastic used for desk and table tops. Resists heat.

5. Then be sure to wipe under all objects, such as telephone, staplers, name plates, typewriters, and papers. Replace them in the right place.



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************************************************************
*                                                          *
*  CAUTION:  Some employers do not want any papers touched. *
*            Your supervisor will know the rules.          *
*                                                          *
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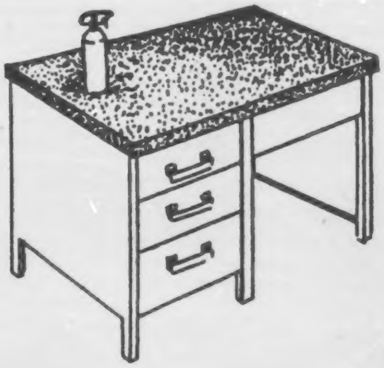
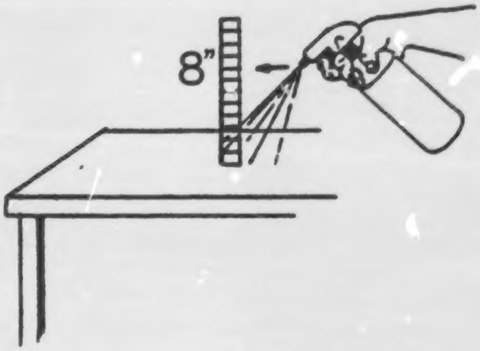
6. Desk tops made of formica also can be cleaned with glass cleaner.



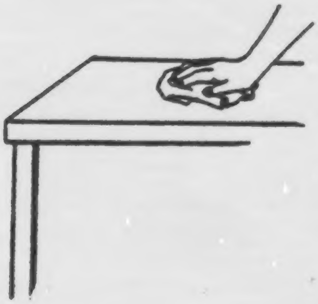
JOB STEPS

7. For desk tops made of wood, use furniture polish. Be sure to read instructions on the can.

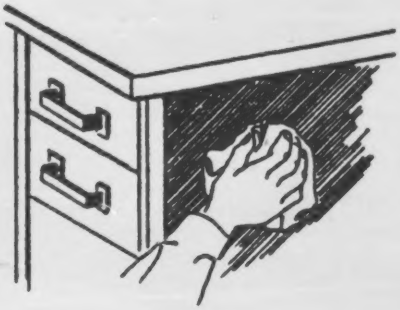
8. Shake the can, then spray from about 8 inches above the desk top.



9. Wipe quickly with a clean wiping cloth.



10. Also wipe the sides of any desk that has edges to collect dust.



11. When done, return all equipment to the storage area.

building maintenance & engineering

unit: Office Cleaning

capital area career center

module: 2201 06 003 date: 12-19-76 level: 2

skill title: Complete Care of Offices

developed & written by: Dwight Smith

visuals by: Sandra Starnaman

WORD GUIDE

DETERGENT - Liquid or powder soap added to water.

PERFORMANCE OBJECTIVE

You are going to learn:

How to clean offices.

And in order to do this you will need:

- Vacuum Cleaner
- Dusting Brush
- Wiping Cloths
- Furniture Polish
- Spot Remover
- Dust Pan
- Bench Brush
- Bucket
- Extra Plastic Trash Basket Liners
- Putty Knife
- Large Trash Basket
- Metal Container for Cigarette Butts
- Dust Mop
- Sponge
- Detergent

We will know that you can do it when:

You have cleaned an office so that floors, carpets, furniture, walls, and ledges have no dust, stains, or dirt on them.

INFORMATION	MATERIALS	LOCATION OF MATERIALS
Review modules: 2201 05 3 Vacuuming 2201 06 1 Dusting 2201 06 2 Cleaning Desk Tops 2201 02 3 Washing Walls After you have reviewed the above modules, watch the slide tape for this module. When you have watched the slide tape, you can study the job steps for this module.		

Job Steps

1. Take your large trash basket ot the work area. Also take extra trash basket liners.
2. Empty the office trash baskets into your large trash basket. Replace dirty liners.
3. Be sure to return trash baskets to their place. Do not leave on desks or tables.
4. Return to the storage area and take a metal container for cigarette butts. Also take a damp wiping cloth.
5. Empty the office ash trays into your metal container. Wipe each ash tray clean with your cloth.
6. Get other equipment and take to work area.
7. Dust curtains with the vacuum. Start at the top.
8. Use spot remover and wiping cloth to remove stains on carpets.
9. Use your putty knife to remove objects stuck to the floors or carpets.
10. Dust all places that collect dust on walls, cabinets, desks, ledges and registers.
11. Use sponge and detergent solution to remove heavy dirt from ledges, window sills or tables.
12. Polish desks and furniture. Be sure to leave all equipment and papers on the desk as they were before you began.
13. Vacuum all carpets and dust mop hard floors. Use your dust pan and bench brush to pick up piles of dirt.
14. Return your equipment to the storage area and clean it.
15. Return to the work area and check to be sure that you have not left any equipment or materials.
16. Turn out the lights in the work area if they are not being used.

JOB STEPS

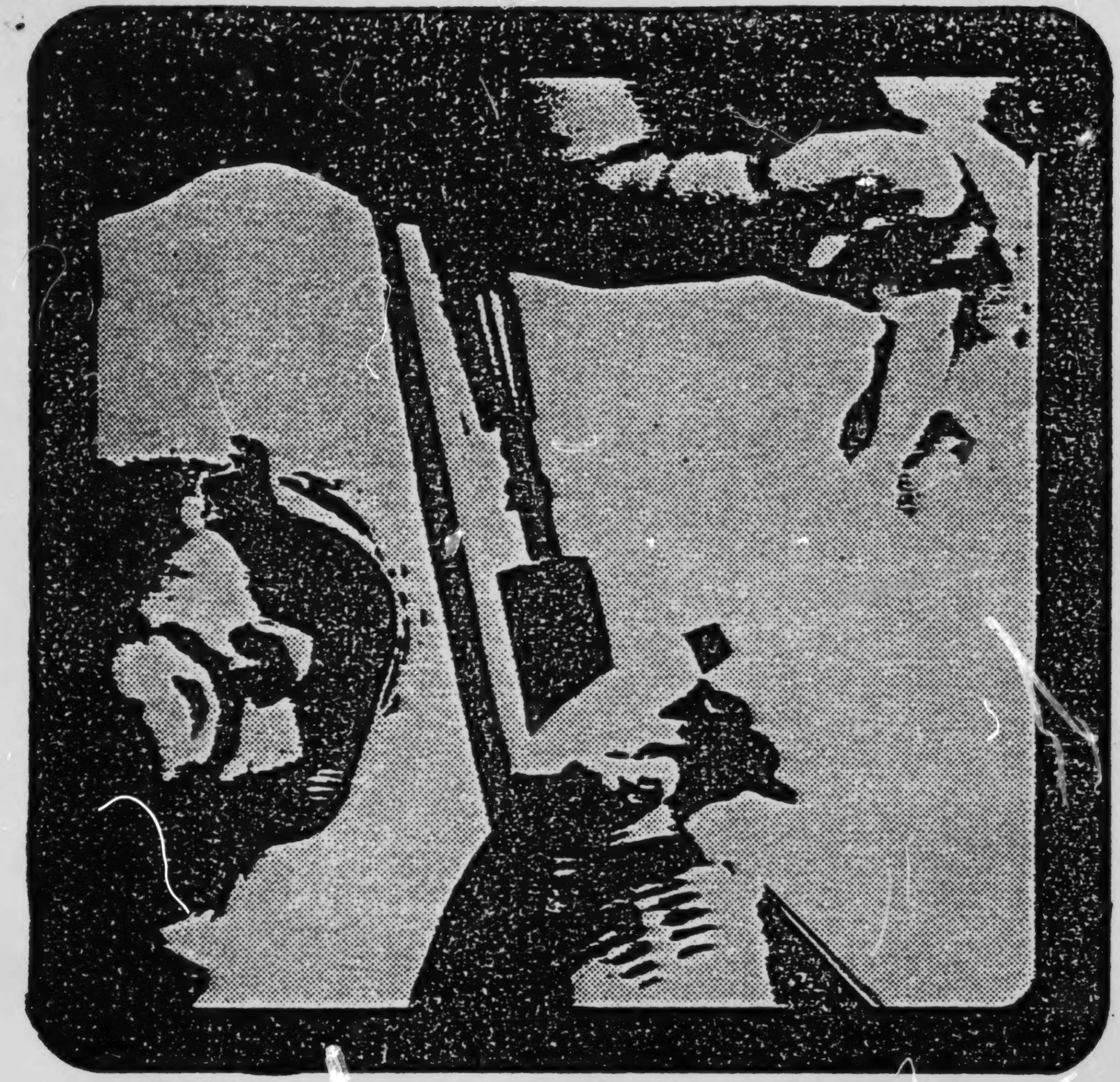
12. Use sponge and detergent solution to remove heavy dirt from ledges, window sills, or tables.

13. Polish desks and furniture. Be sure to leave all equipment and papers on the desk as they were before you began.

14. Return your equipment to the storage area and clean it.

15. Return to the work area and check to be sure that you have not left any equipment or materials.

16. Turn out the lights in the work area if they are not being used.



building maintenance & engineering

unit: EXTERIOR GROUNDS

capital area career center

module: 2201 07 001 date: 2/77 level:

skill title: Removal of Snow and Ice

developed & written by: Buster Crabb

visuals by: Bevan Suits

PERFORMANCE OBJECTIVE

You Are Going To Learn:

How to remove snow and ice from walkways.

And In Order To Do This You Will Need:

Snow/Ice covered walkways

Snow shovel

Power snow removal, (snow blower, snow plow)

Proper clothing

a. Rubber boots

b. Gloves and cap

c. Winter coat

Sand or salt pellets

Ice scraper

Bucket

Street brush

Pencil and checklist

We Will Know You Can Do It When:

All snow and ice is removed, or sand/salt pellets have been spread on remaining icy areas.

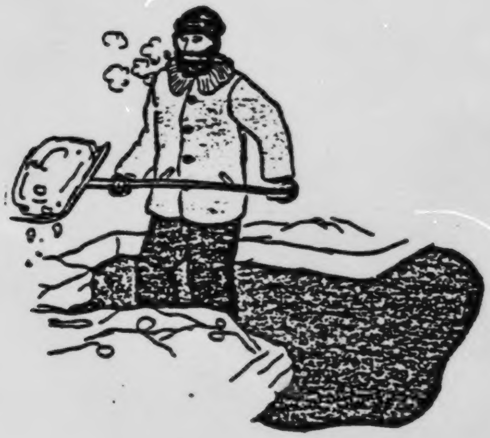
INFORMATION	MATERIALS	LOCATION OF MATERIALS
Snow or ice on the sidewalks can cause injury. It is very important to remove the snow and ice prior to arrival of people at your building. When ice remains, spread either sand or salt pellets on ice to melt it. Then remove it. When using sand it will cause additional cleaning because of the tracking of sand into the building. When the sand has served its purpose, be sure to pick it up and dispose of it.		

JOB STEPS

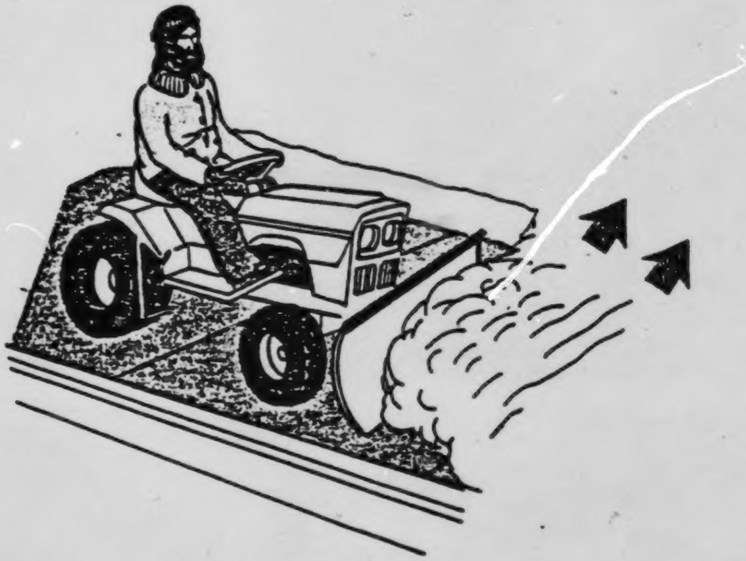
1. Be sure you have all equipment needed.

2. Remove snow and ice from entrances with snow shovel and ice scraper.

CAUTION: Avoid strain on back by using legs to push and lift.

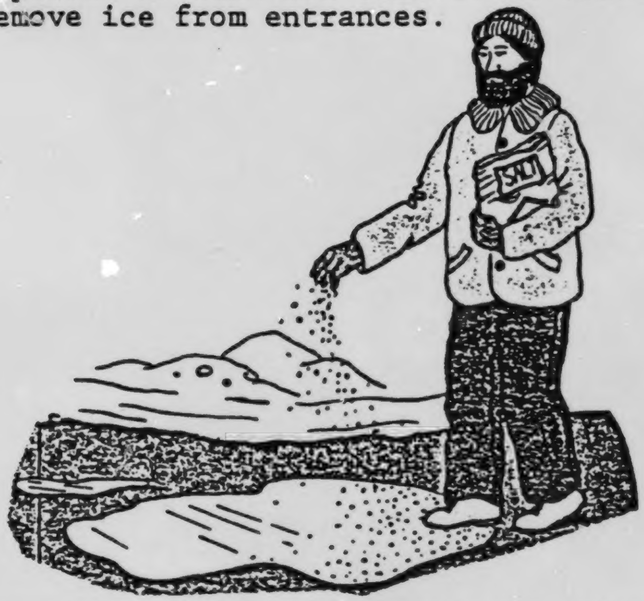


3. The cleaning of sidewalks and driveways is generally done with a power snow remover (plow). Push the snow and ice onto the lawn area rather than into the streets or gutters.



JOB STEPS

4. Use an approved salt pellet or sand for removal of remaining ice as required to remove ice from entrances.



5. Clean and dry all equipment. Return equipment and materials to proper storage area.

6. Make numerous spot checks of icy areas for melting and then removal.

7. When using sand, remove sand after its purpose is done, by sweeping it up and disposing of it in a trash container.

building maintenance & engineering

unit: EXTERIOR GROUNDS

capital area career center

module: 2201 07 002 date: 2/77 level:

skill title: Lawn Care - Shrubbery

developed & written by: Buster Crabb

visuals by: Bill Draper

WORD GUIDE

PRUNE - The removal of excess growth and the shaping of the shrub.

PERFORMANCE OBJECTIVE

YOU ARE GOING TO LEARN:

How to prune shrubs.

AND IN ORDER TO DO THIS YOU WILL NEED:

Shrubbery

Pruning shears (lopping or snap-cut)

Pruning shears pole

Sharp knife

Saw

Leather gloves

Trash Container

Alcohol

Paint brush (1")

WE WILL KNOW YOU CAN DO IT WHEN:

The natural form of the shrub is preserved.

WORD GUIDE

CREOSOTE - An oily liquid with a burning taste and penetrating odor, obtained from wood tar. Used on fence posts to preserve them.

DORMANT - Sleeping season.

INFORMATION

Shrubbery should be pruned annually. There are certain times for pruning. For example, shrubs that bloom in spring should be pruned immediately after they bloom. Shrubs that bloom in summer or fall should be pruned during the dormant season.

If in doubt when to prune, call your local horticulturist.

After pruning shear has been used, clean it with alcohol, this will prevent the transmittal of possible disease. Cut surfaces should be treated with creosote or other recommended materials to prevent decay.

NOW DO the following two things:

1. Inspect your shrubs and decide which branches need pruning (see step 4).
2. Be sure it is the proper season to prune certain shrubs. See your local horticulturist.

Now proceed to the next page.

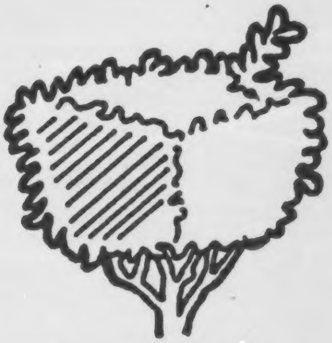
JOB STEPS

1. Proceed to work area with your equipment.

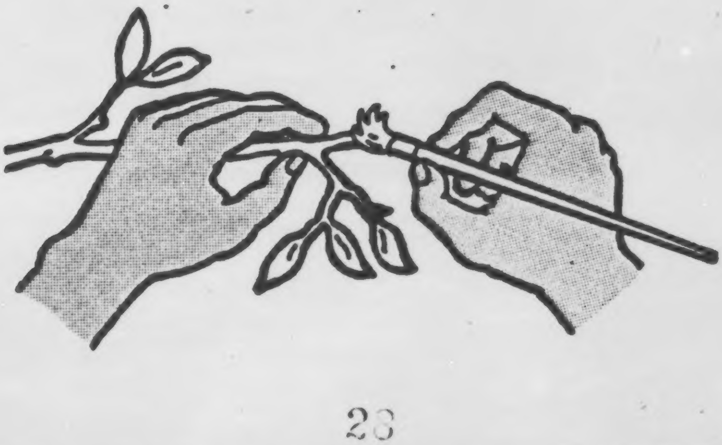
2. Cut undesirable material such as dead branches, branches with dying leaves, or surplus growth.

3. Be sure your cut is clean when using the pruning shear, knife or saw.

4. Check shrub for shape. Trim only the tips of branches or twigs to help balance shrub. Do not break off branches or leave them untreated.

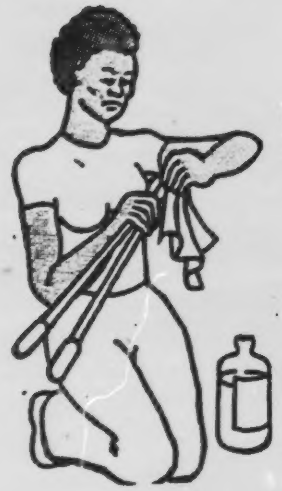


5. Brush creosote or other recommended material on to the cut areas of the shrub.

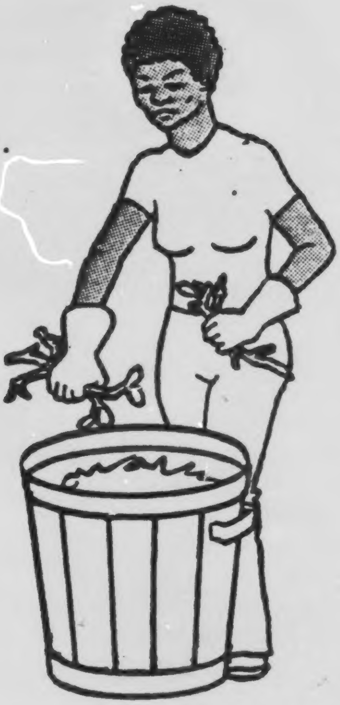


JOB STEPS

6. Before going to the next shrub, clean off your cutters.



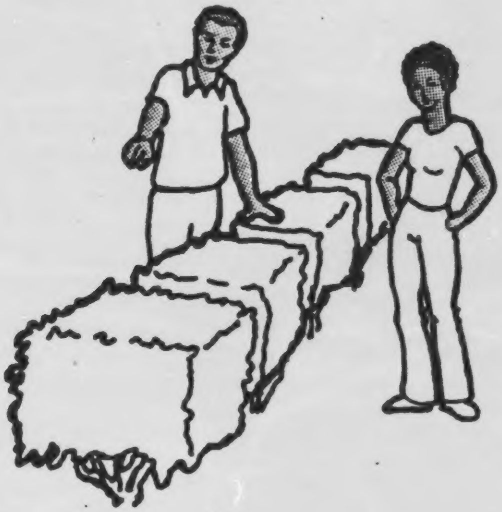
7. Put all cuttings in the trash container.



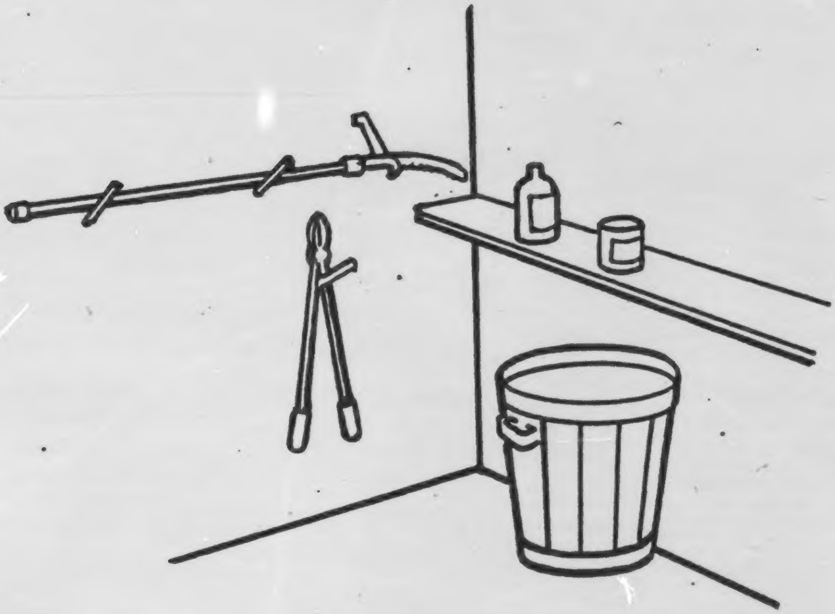
8. Repeat Job Steps 2 - 7 for each shrub in your work area.

JOB STEPS

9. Ask your instructor to check your work.



10. When done, put away all equipment and supplies.



building maintenance & engineering

unit: Grounds

capital area career center

module: 2201 07 008 date: 8/77 level: II

skill title: Mixing and Pouring Concrete Bumpers

developed & written by: Buster Crabb

visuals by: Dave Brown

WORD GUIDE

AGGREGATE - Materials for mixing with cement (sand, gravel, etc.)

PERFORMANCE OBJECTIVE

You are going to learn:

How to pour a form for concrete bumpers.

And in order to do this you will need:

- Wood/metal bumper form
- Reinforcing rod
- Cement mixer
- Cement
- Aggregate (gravel/stone)
- Shovel (flat end type)
- Wheelbarrow
- Wood float
- Pail
- Water hose
- Water
- Linseed oil
- Old paint brush
- Metal float
- Edging tool

We will know you can do it when:

The reinforcement steel rod has been placed in the center of the cement and the cement has set up and is hard.

INFORMATION

Each pouring of a bumper form is a little different due to size, shape and depth.

Many people call concrete, "CEMENT". Actually, cement is the grey powder which you mix with water, sand and aggregate to make concrete. When using a power-mixer, always put a small portion of water into mixer first. Then put in the dry materials and mix thoroughly. Then add water as needed for desired mixture.

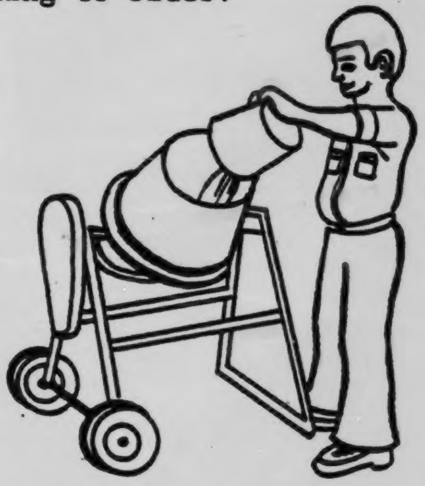
See your instructor for the proper safety precautions on the starting of the power-mixer.

JOB STEPS

1. Take all equipment and materials to your work area.

2. Start mixer (if electrically or engine-driven, see instructor for starting procedures).

3. Pour a small portion of water into mixer barrel to keep dry powder from sticking to sides.



4. Put proper portion of sand into mixer barrel.

   NOTE: (See sample formula in Module 2201 07 009, for steps #3, 4, 5, 6).

5. Put proper portion of aggregate into mixer barrel.

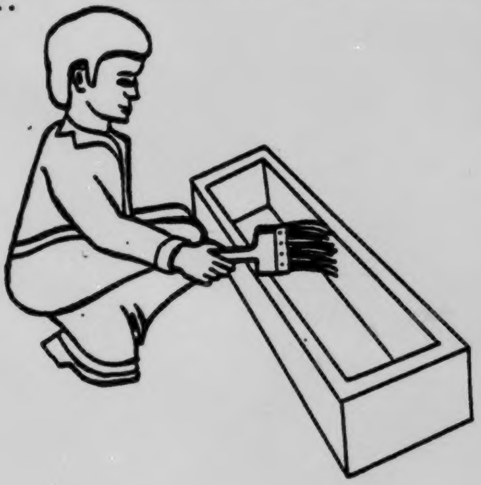
6. Put proper portion of cement into mixer barrel.

7. Now, pour water into mixer for desired mixture.

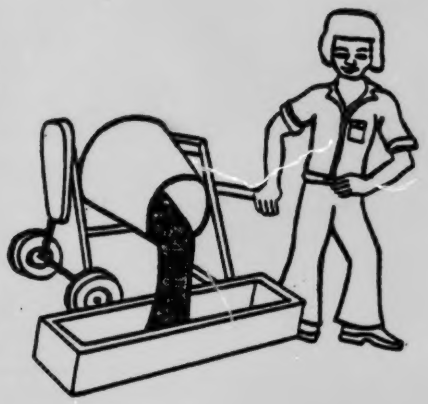
   NOTE: Before dumping concrete into form, do the next step.

JOB STEPS

8. Take an old paint brush and brush the inside of the form with linseed oil.



9. Now, pour concrete mixture into form until it is full to the top.



10. Gently tap the sides of the form with your shovel. This settles the concrete and releases any air-pockets.

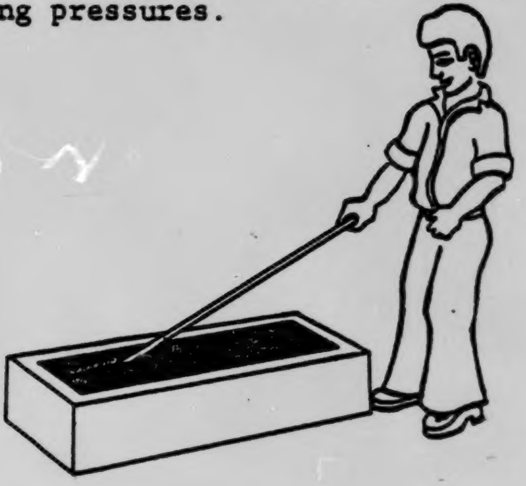
WORD GUIDE

INSERT - Put in.

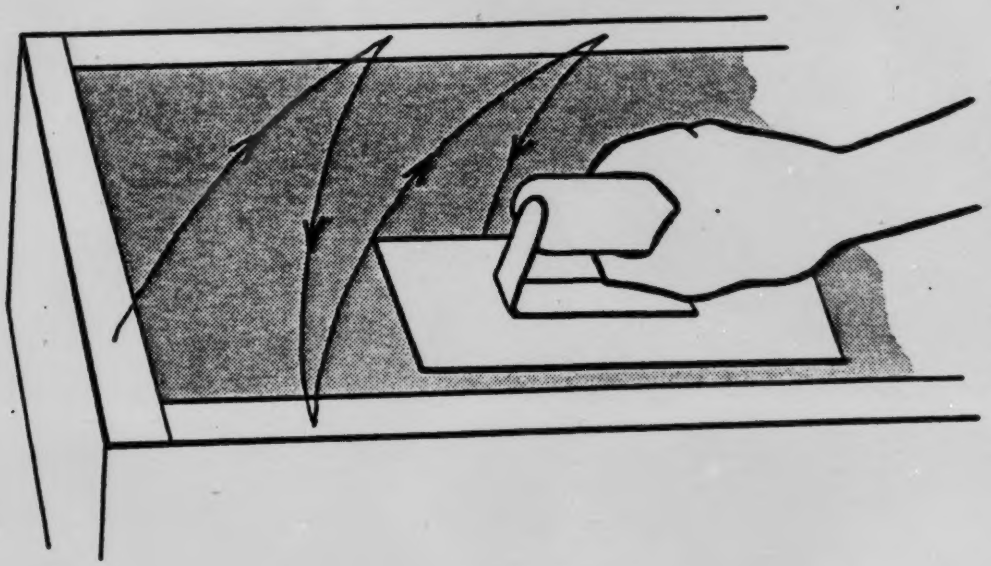
JOB STEPS

11. Insert metal reinforcing rod 1/2 way into the cement mixture.

NOTE: Concrete resists compression or pressure with the steel rod. It also resists tension stresses or pulling pressures.



12. Using trowel, smooth off the concrete level with the top of bumper form.



JOB STEPS

13. Allow about two days for the concrete to set up, then remove forms.

14. Clean all equipment and materials and return them to storeroom.

building maintenance & engineering

unit: Grounds

capital area career center

module: 2201 07 009 date: 8/77 level:

skill title: Power Mixing Concrete

developed & written by: Buster Crabb

visuals by: Bill Draper

WORD GUIDE

AGGREGATE - Sand, gravel or other materials used to mix with cement to form concrete.

PERFORMANCE OBJECTIVE

You are going to learn:

How to power-mix cement.

And in order to do this you will need:

Power cement mixer

Cement

Aggregate

Water hose (if possible)

Stiff brush

Shovel (flat end)

Pail

Water

We will know you can do it when:

You have mixed the cement, water, sand and aggregate to produce a gray, putty-like mixture.

WORD GUIDE

SOFT STONE - Is called "floatstone", which floats to the surface of the concrete and pops out or loosens itself from the concrete creating stone-size holes in the surface.

INFORMATION

When using the power mixer, never overload. Be sure to read instructions for the size mixer you are using.

Too much water will weaken the cement, so never add so much water that the cement becomes fluid. If it becomes fluid, stones may come to the surface causing "floatstone".

Cement is referred to as "Portland Cement" which comes in the form of a powder. When you mix cement, water and aggregate, it becomes a form of paste. As this mixture hardens, the result is "CONCRETE".

When steel bar reinforcing is embedded in concrete, it will make the concrete stronger. This is called "reinforced concrete".

WORD GUIDE

HOPPER - A bin, box or tank for holding materials.

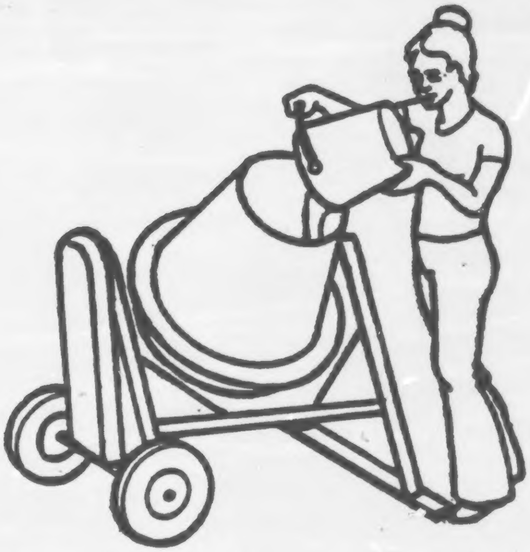
ROTATING - Turning.

JOB STEPS

1. Take your equipment and materials to your mixing work area.

2. Plug in the mixer and turn the "ON/OFF" switch to the "ON" position.

3. Pour 12 quarts of water into the mixer hopper while it is rotating.



4. Place 2 shovels-full of sand into the rotating hopper.

5. Place 4 shovels-full of aggregate into rotating hopper.

WORD GUIDE

CIRCULATION - Movement around an entire area.

STURDY - Strong.

JOB STEPS

6. Place 1 shovel-full of cement into rotating hopper.

   NOTE: Cement must be stored high-and-dry, avoiding dampness (which causes it to harden), and where it has air-circulation.

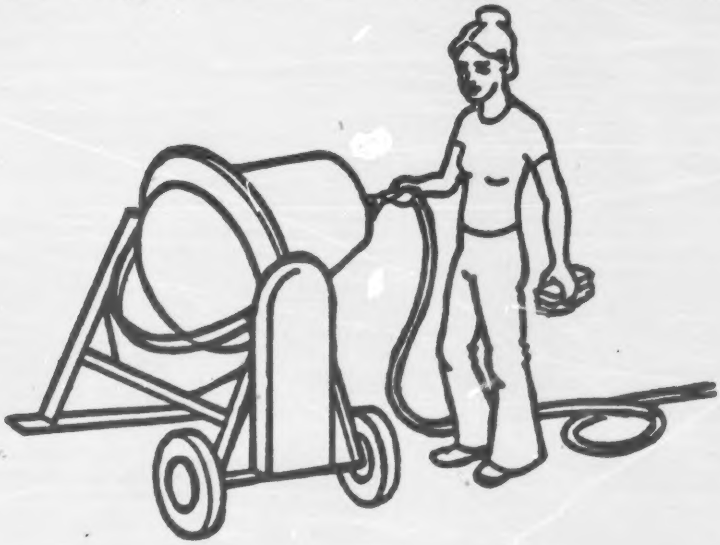
7. If a larger batch is needed, repeat steps #3, 4, 5, and 6. This also depends on size of mixer.

   NOTE: Allow each batch to mix about one minute before adding another mix. Do not let the hopper get more than 3/4 full.

8. Repeat the steps until your job is completed.

9. Turn off the mixer and unplug it.

10. Prepare to clean your mixer as soon as possible after the last batch is poured. Use a sturdy brush and the water hose.



JOB STEPS

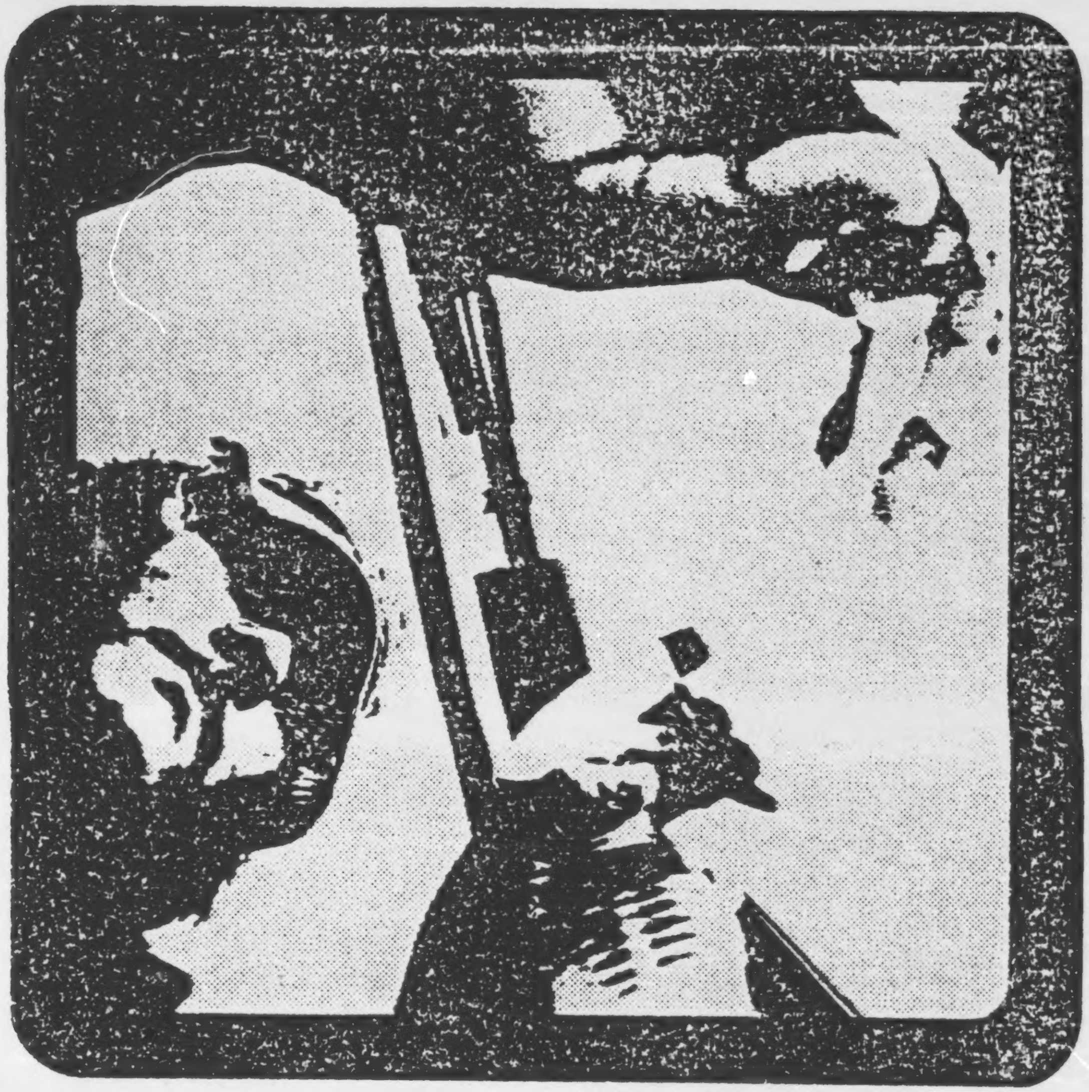
11. Restart the mixer.

12. With your hose and water turned on, rinse the outer part of mixer and also the inside of the hopper.

13. Turn off the mixer and unplug it.

14. Place mixer under cover.

15. Clean all other tools used during your job and return them to storeroom.



building maintenance & engineering

unit: Grounds Maintenance

capital area career center

module: 2201 07 010 date: 1/8/77 level: 1

skill title: Operation of Small Lawn Tractors

developed & written by: Daniel M. Woodward

visuals by: Mary Ann Gamel

PERFORMANCE OBJECTIVE

You Are Going To Learn:

How to use a small lawn tractor.

And In Order To Do This You Will Need:

A small lawn tractor

We Will Know You Can Do It When:

You can start and use the tractor without putting yourself or anyone else in danger.

INFORMATION

Why do we need to learn to use a small lawn tractor?

We want you to learn how to use it safely and correctly. If used in the right way, it can do many things that save work and time.

It costs a great deal of money and it must be used properly to avoid damage. practice helps. you probably will have a hard time at first, but keep practicing.

Can using a small lawn tractor be dangerous?

Yes, if you do not watch your own movements. It is just like any other moving machine.

NOW DO:

Tractors should be used in the correct way because:

A. You could hit someone
B. You could ruin the tractor
C. They can be very helpful
D. All of the above are right

Did you pick "D"? That question took some thinking. If you missed "D", go back over the question and the information you just read.

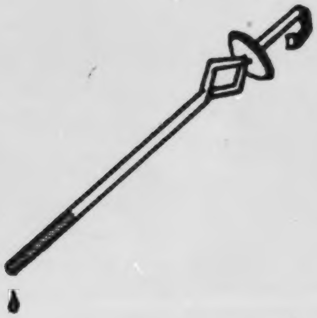
Before doing job steps, watch the slide tape on the operation of a small lawn tractor.

JOB STEPS

****
CAUTION! Be sure to read all of this module before starting the tractor. Learn where your emergency brake is (left pedal).
****

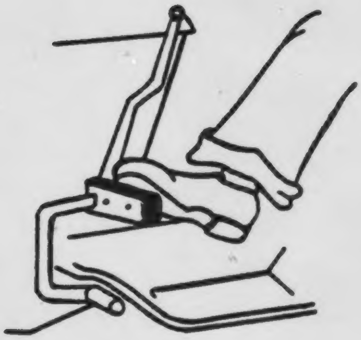
1. Check gas tank under the hood of the tractor.

2. Check the oil. How much oil do you need?



3. Sit in the tractor's seat.

4. Push down the brake pedal on the left side of the tractor with your foot.



WORD GUIDE

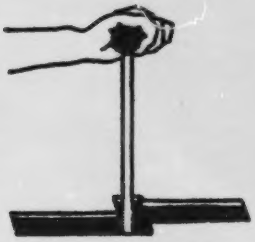
SHIFT LEVER - Lets you go from forward to neutral to reverse by moving it.

NEUTRAL - When just the engine runs, but tractor is not in gear.

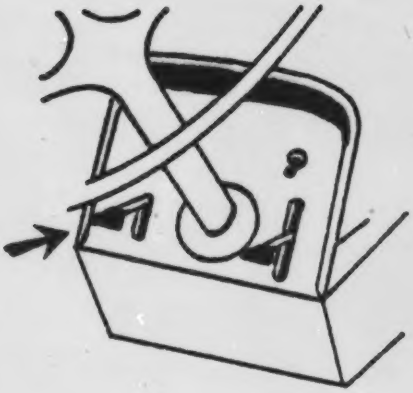
CHOKE - Makes more gas go into the engine to help it start when it is cold.

JOB STEPS

5. Look at the shift lever between your right leg and the tractor. It should be in the neutral or in the "N" slot.



6. Lift the choke lever all the way up.



WORD GUIDE

THROTTLE - Makes the tractor go faster or slower.

P. T. O. - POWER TAKE OFF. Runs any extras on a tractor, (mower, snow blowers, ground tillers).

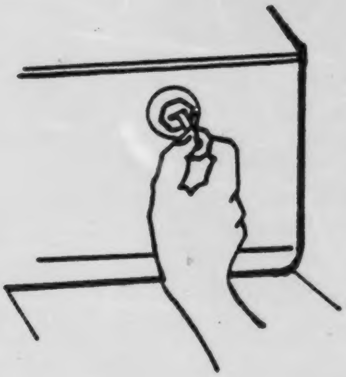
CLOCKWISE - The direction that hands of a clock move.

JOB STEPS

7. Lift the throttle lever 1/2 way up on the slot.

8. Push the P. T. O. switch down. The switch is above the throttle lever.

9. Turn the key clockwise until the engine starts. When it does, immediately let go of key.



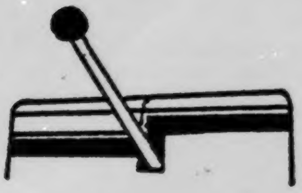
10. Push the choke lever down after the engine has run for a minute.

    NOTE: If the engine is not running, do job steps 4, 5, 6, 8, 9, and 10 over.

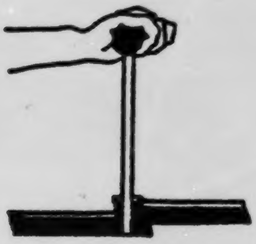
JOB STEPS

11. Wait 2 or 3 minutes to let the engine warm up.

12. Look in front of the seat and study the shift lever pattern.

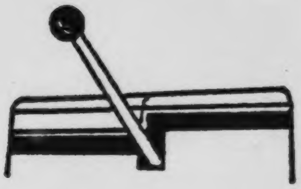


13. Put your right hand on the shift lever which is between your right leg and the tractor.

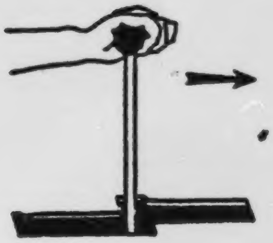


JOB STEPS

14. Move the shift lever out to your right.



15. Slowly push the shift lever to the front of the tractor. You should be moving.

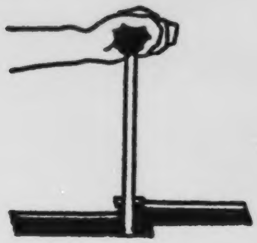


16. To go faster, push the shift lever more to the front of the tractor.

JOB STEPS

17. To stop the tractor, push down the left pedal. If you ever have a problem driving, push the left pedal down. Use it only if you have a problem, or to shift from forward to reverse.

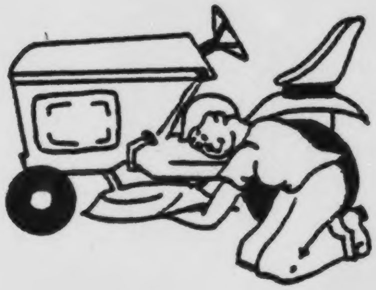
18. Put your right hand on the shift lever on the right side of the tractor.



19. To make the tractor go backwards: first--push down the left peddle, second--push the shift lever down and pull back.

    NOTE: The next job steps tell you how to use the mower which is on the underside of the tractor.

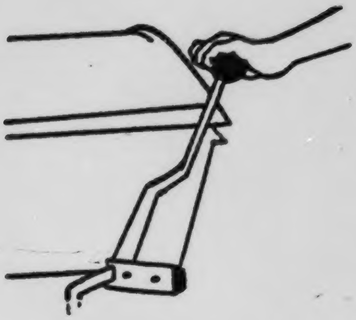
20. With motor off, check mower blades for sharpness.



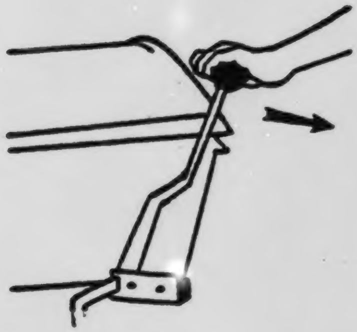
JOB STEPS

21. Start motor.

22. Put your left hand on the lever between your left leg and the tractor.

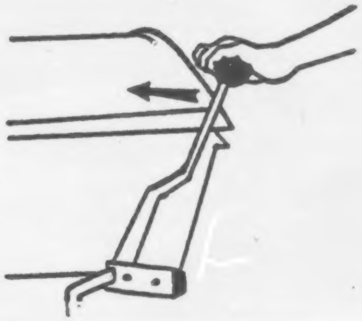


23. PULL BACK; mower will drop down.

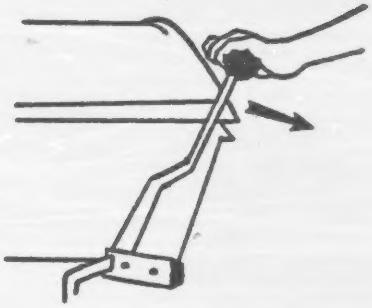


JOB STEPS

24. PUSH to the front of the tractor. This will lift the mower.



25. PULL back the left lever.



26. Pull back the switch above the throttle lever (P.T.O. switch).

27. LIFT the switch UP. THE MOWER BLADES ARE TURNING---BE CAREFUL.

JOB STEPS

28. To stop the turning blades, PUSH the switch DOWN.

    NOTE: DO NOT turn mower blades on unless the mower is DOWN.

29. To stop the tractor, turn the key left. It will be straight up and down.

30. Do all the Job Steps again.

31. Ask yourself this question.

    DO I FEEL SAFE USING THIS TRACTOR?

32. If you don't, spend more time doing the job steps.

33. Drive the tractor around the lawn or parking lot.

34. Go forward.

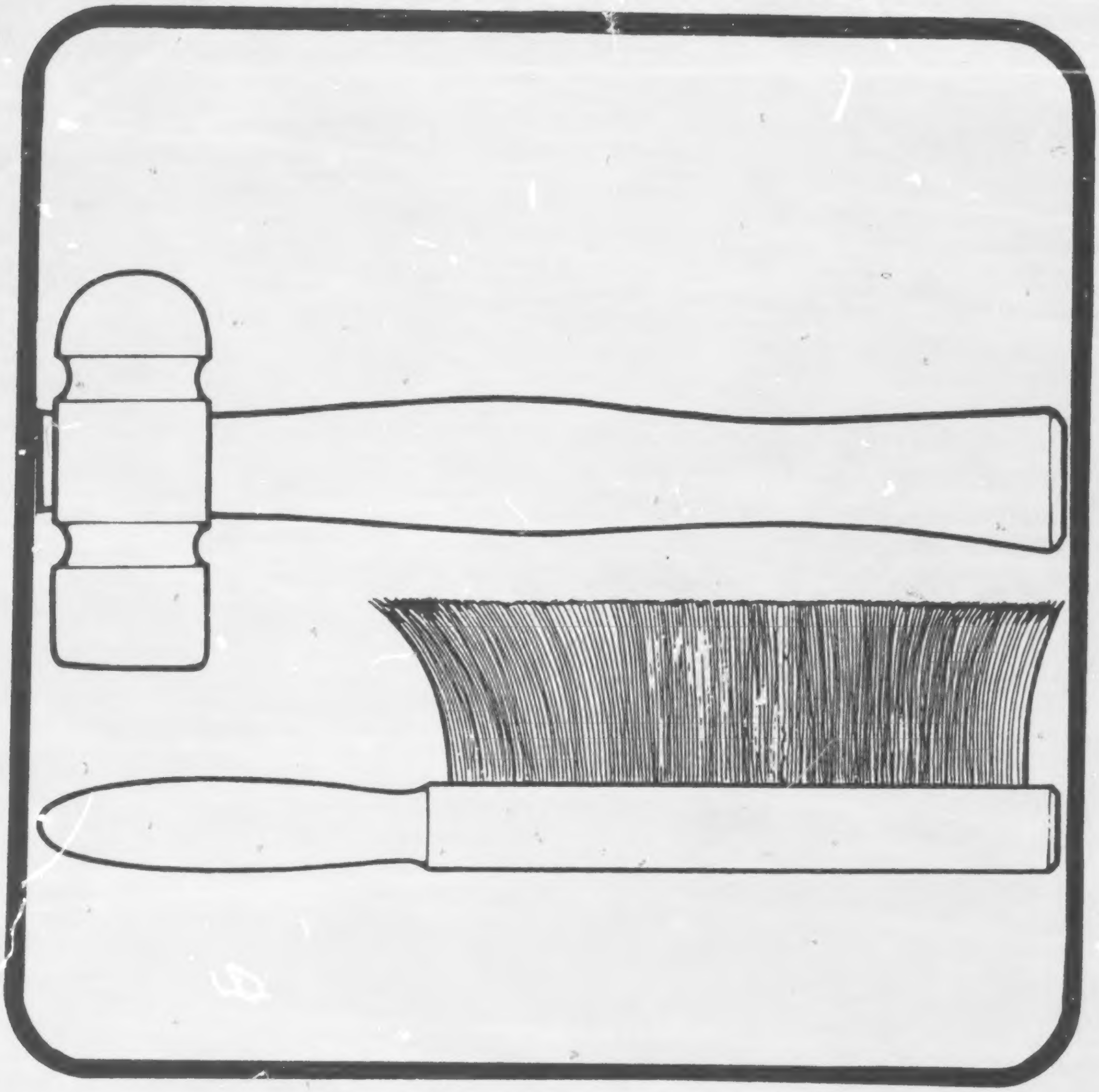
35. Go backward.

36. Raise the mower.

37. Lower the mower.

38. Turn the blades on and off.

39. BE CAREFUL.



building maintenance & engineering

unit: LAWN CARE - GENERAL MAINTENANCE

capital area career center

module: 2201 07 011 date: January 1977 level:

skill title: Mowing - Power Driven Hand Mower

developed & written by: Daniel M. Woodward

visuals by: Bill Draper

WORD GUIDE

MOWER BASE - The part that the engine sits on.

LEVER - On the top of mower handle. It goes forward and backward to do two things. 1. Makes engine run slower and faster. 2. Makes the mower go forward.

PERFORMANCE OBJECTIVE

You Are Going To Learn:

How to mow a lawn using a power driven hand mower.

And In Order To Do This You Will Need:

Power Driven Hand Mower

Gasoline Oil

Lawn Hose

We Will Know You Can Do It When:

You have completed the job steps and safely mowed a lawn.

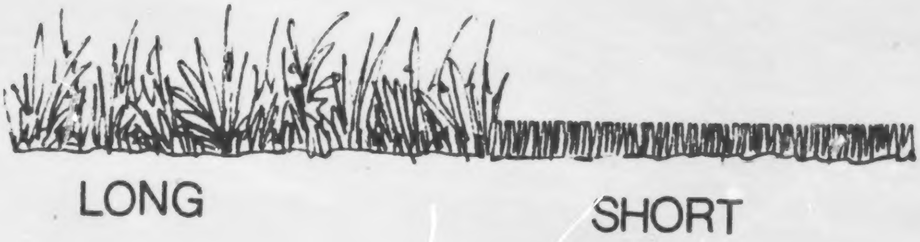
INFORMATION

What is a Power Drive Hand Mower?

It is the same as a push type lawn mower but it has a motor that helps the mower move it forward with less work.

When should we mow a lawn?

When it becomes too long or uneven.



What is too long?

Grass that is 2 1/2 - 3 inches high.

What are some things to remember when mowing?

Do not mow when the grass is wet.

Keep your hands and feet away from the mower base when it is running.

Do not cut the grass too short. Usually 1 1/2 - 2 inches is OK.

Take stones, glass, and pieces of wood off the lawn before mowing.

Clean up sidewalks, the mower, and yourself when done.

Do not mow flowers and shrubs.

NOW DO:

You should keep your _____ away from the mower base when it is running.

A. Hands
B. Feet
C. Arms
D. All of the above

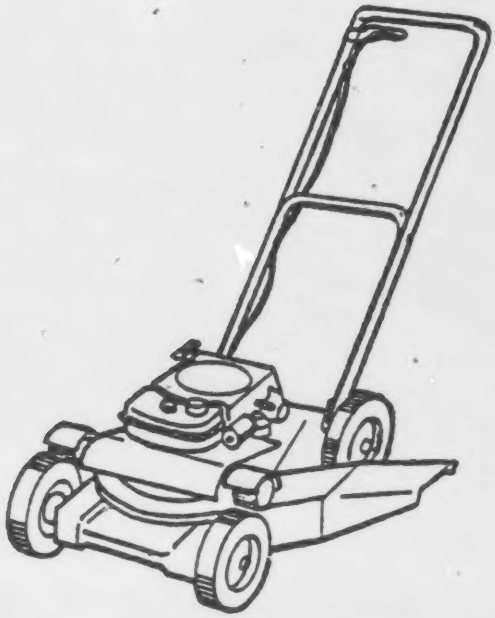
Hope you picked "D". The blade could cut any of these.

JOB STEPS

1. Walk around the lawn and look for wire, stones, or glass.

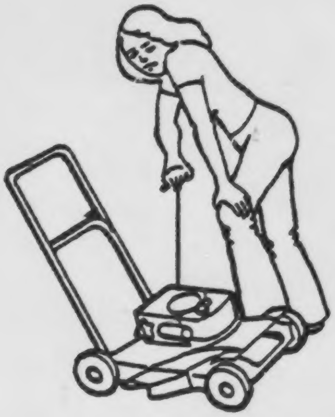
2. Do not start mower. Fill gas tank with gasoline. Be careful not to spill it on the lawn.

3. Check oil level on the engine. It is on the mower base. Is it full? Add if it is not full.



JOB STEPS

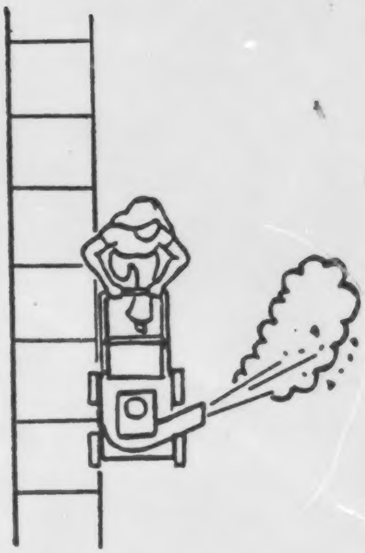
4. Move the lever on the handle to START.



5. Put your foot on the mower base and pull the rope. After it starts, let go of the rope.

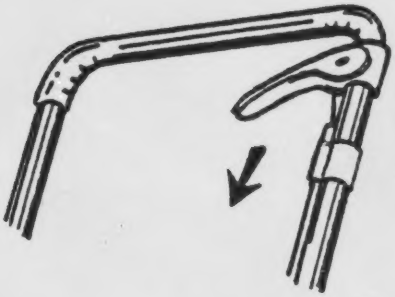
6. Move the lever on the handle to RUN.

7. Place the mower so the chute throws the cut grass on the lawn.

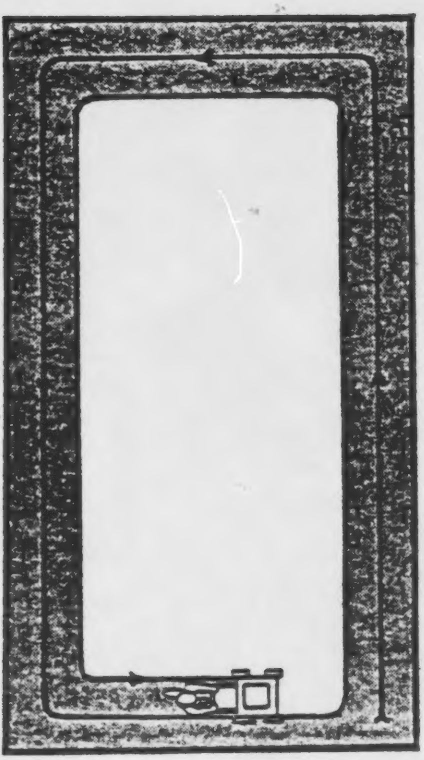


JOB STEPS

8. Push drive lever on the handle forward. Mower will move.



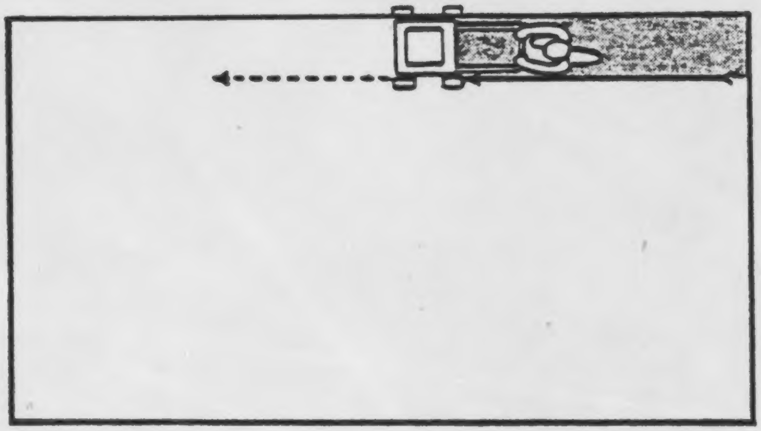
9. Mow around lawn 2 times. You will need the mowed space to turn around in.



JOB STEPS

10. Starting in a corner, mow in a straight line back and forth.

NOTE: Be sure to put the front wheel on the wheel mark from the last cut.



11. Turn around and come back.

12. Watch for flowers and shrubs.

13. When finished, move the lever on handle to STOP.

14. Wash mower with a hose. Wash under the mower.

15. Put mower, gasoline, hose, and oil away.

building maintenance & engineering

unit: Lawn Care - Grounds

capital area career center

module: 2201 07 012 date: 1/9/77 level: 1

skill title: Mowing with a small lawn tractor

developed & written by: Daniel M. Woodward

visuals by: Bill Draper

WORD GUIDE

CHUTE - Place on tractor where the clippings come out.

PERFORMANCE OBJECTIVE

You Are Going To Learn:

How to mow grass using a small lawn tractor.

And In Order To Do This You Will Need:

Small lawn tractor

We Will Know You Can Do It When:

You have mowed the lawn safely, removed all wires, glass, and stones and all the grass is cut evenly.

INFORMATION	MATERIALS	LOCATION
Why do we use a tractor to mow a lawn? To save time and work. With a small tractor, we can mow more grass in less time than with a push mower. How will I know how to start and use a small lawn tractor. By completing Module 2201 07 010R. It will show you how to safely use a lawn tractor. How will I be able to drive the tractor around trees, flowers and shrubs. All hard to-get-at places and still do a good job? You won't. Stay away from all hard to-get-at places. After you mow the large area, you can then use a power hand mower to finish. Remember; always pick the correct tool or machine for the job. Before you use a power hand mower, you should have done Module 2201 07 011R. This module shows you how to use a power hand mower safely. NOTE: Do not mow when the grass is wet.		

INFORMATION	MATERIALS	LOCATION

ANSWER THESE QUESTIONS:

Why do we use a tractor to mow large areas?

A. To save time and work
B. To play tractor driver
C. To waste time
D. To make more noise

"A" is the correct answer.

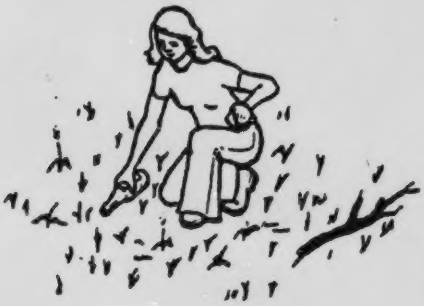
We should always try to pick the correct tool or machine for the ______________.

A. Glove
B. Job
C. Tool or machine
D. All of the above are right

Did you pick "B" on this one?

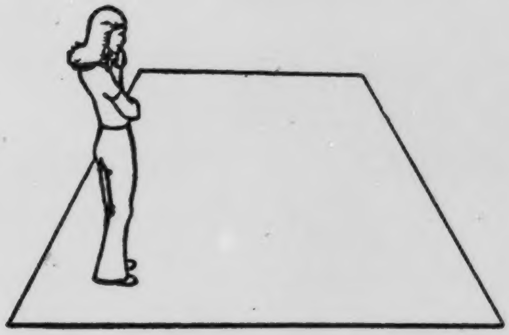
JOB STEPS

1. Pick up all wires, glass and stones.

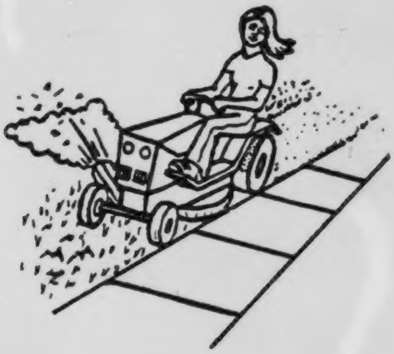


2. Point tractor so that the chute does not blow clippings on the sidewalk or building.

3. Look over the area and decide which is the long direction. You will mow in that direction, back and forth.

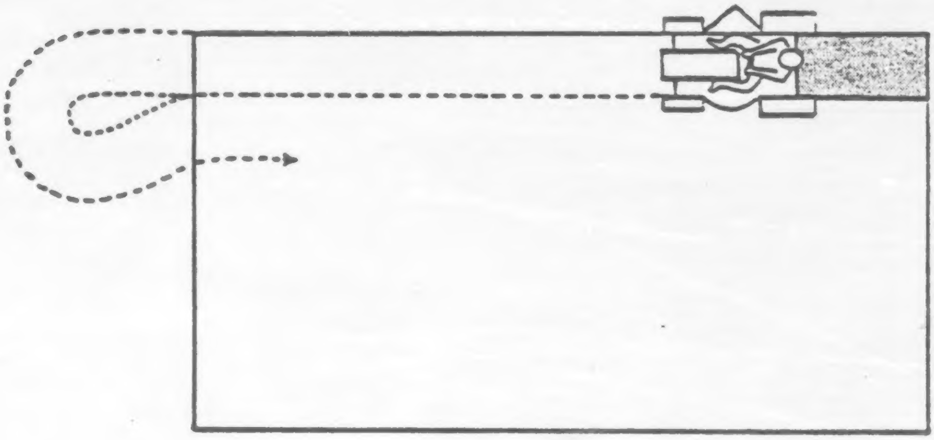


4. Mow 4 times around the whole lawn. This will give you room at the edges to turn around.



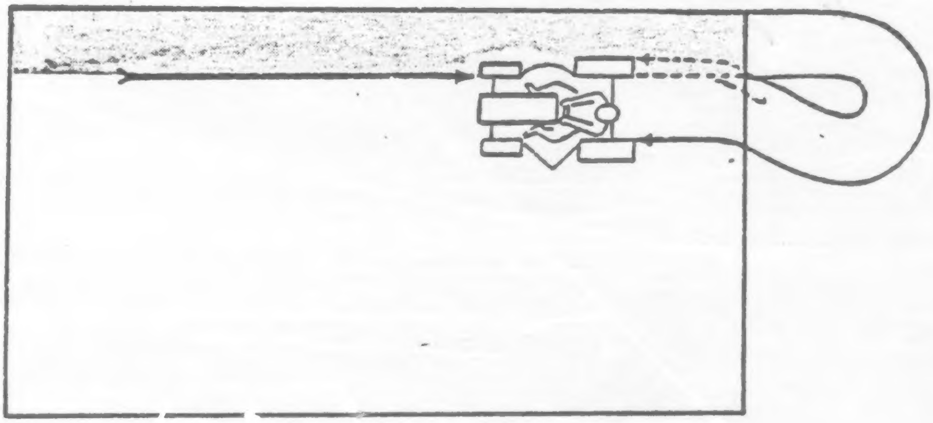
JOB STEPS

5. Start in a corner and make a straight cut.



6. Turn around.

7. Line up front wheel on wheel marks from the first straight cut.

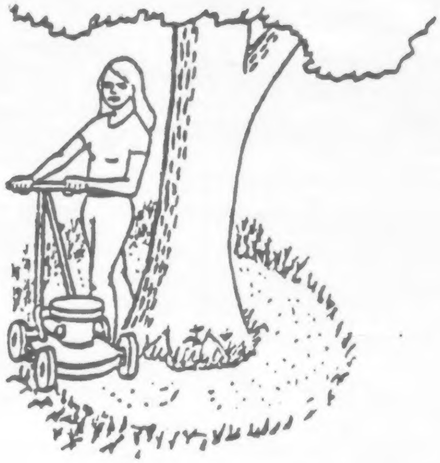


JOB STEPS

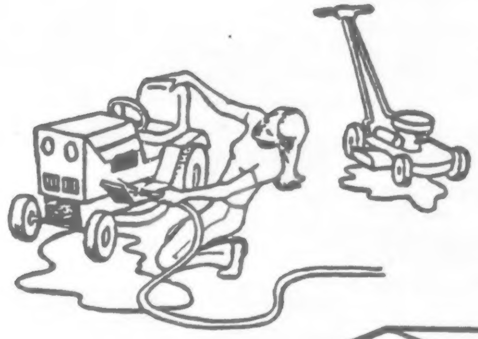
8. When you get to the end of a row, turn around and line up the front wheel with the wheel mark from the last cut.

9. Do the whole area.

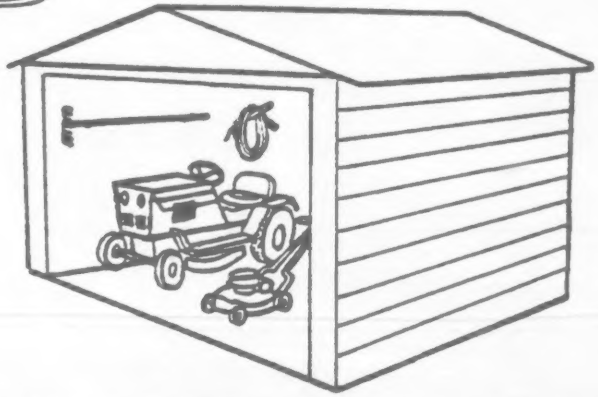
10. Take the power hand mower and mow the hard to get at areas, (trees and shrubs).



11. Clean mower and tractor by spraying the underside of both with water.



12. Put all machines away.



building maintenance & engineering

unit: Lawn Care - General Maintenance

capital area career center

module: 2201 07 013 **date:** 1/7/77 **level:** 1

skill title: Watering A Lawn

developed & written by: Daniel M. Woodward

visuals by: Glen Cooley

WORD GUIDE

SPRINKLER - Throws water on a lawn. There are many types.

VARY - Be different

PERFORMANCE OBJECTIVE

You Are Going To Learn:

How and why to water a lawn.

And In Order To Do This You Will Need:

Garden hose

Sprinkler

Pan

Water supply

Clock or watch

We Will Know You Can Do It When:

You have completed the job steps and the lawn has been watered about one inch every 7 days and remains green.

INFORMATION	MATERIALS	LOCATION

Why do we water a lawn?

In the summer, lawns turn brown because there is not enough water. Watering makes the lawn green and healthy.

Can we water too much?

Yes, about 1 inch every 7 days seems to be good in Michigan. More than that ruins the roots of the grass.

How can we be sure we are getting 1 inch when we water?

By placing a pan under the sprinkler and keeping time on a clock or watch and see how long it

tak?

It may take 20 minutes or more to make 1 inch. This will vary because the amount of water coming out of the sprinkler can be different from one time to the next.

ANSWER THE FOLLOWING QUESTION:

How much water should our lawns have to keep them green?

A. As much as you like
B. Just rain water is enough
C. 1 inch every 7 days
D. 7 inches every month

"C" is the best answer. In dry times, we have to water because the sun dries grass.

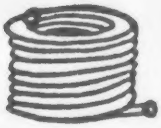
JOB STEPS

7. When you have an inch of water in the pan, stop the water and look at your watch.

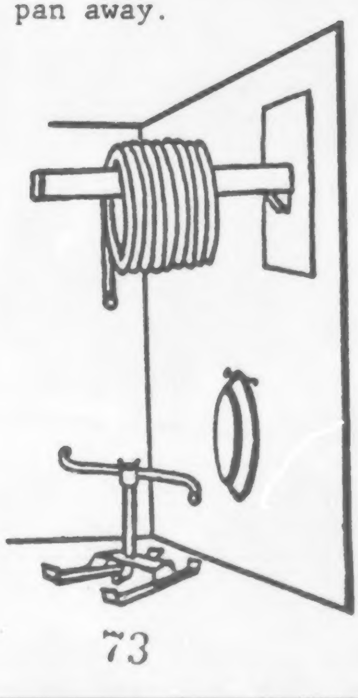
8. If it took 20 minutes to sprinkle one inch of water, then you will allow 20 minutes each time you move the sprinkler to a new area.

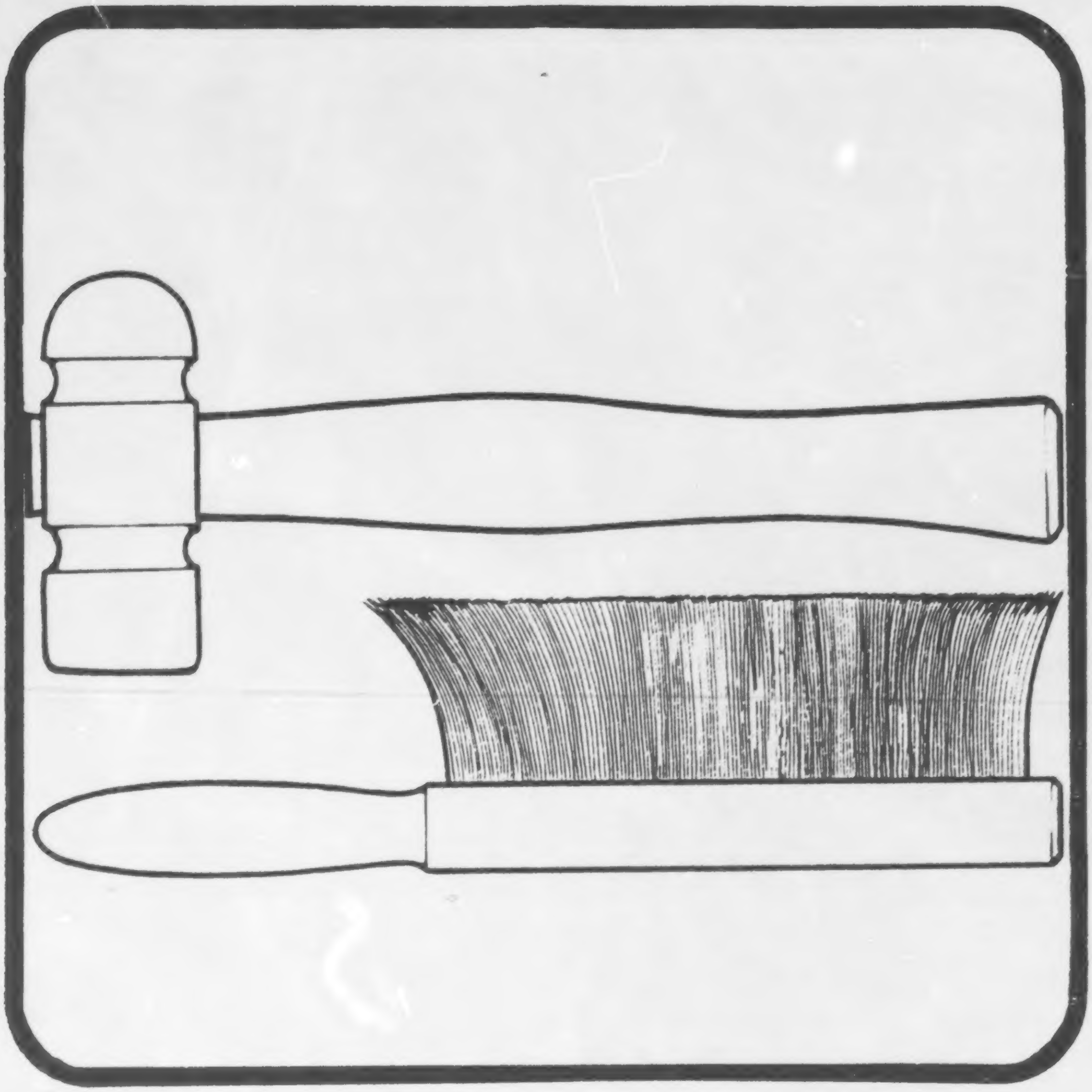
9. After each area has been watered one inch, move the sprinkler to another area. Continue until all the grass has been watered.

10. Roll hose into a coil.



11. Put hose, sprinkler and pan away.





building maintenance & engineering

unit: GROUNDS MAINTENANCE

capital area career center

module: 2201 07 014 date: January 1977 level:

skill title: Use of Mechanical Spreader

developed & written by: Daniel M. Woodward

visuals by: Bruce Bennett

PERFORMANCE OBJECTIVE

You Are Going To Learn:

How to make settings on a mechanical spreader.

And In Order To Do This You Will Need:

A Mechanical Spreader

We Will Know You Can Do It When:

You have made settings for heavy and light amounts of fertilizer.

INFORMATION

Why do we use a mechanical spreader?

It puts fertilizer and grass seed on the soil or lawn more evenly than if you throw it by hand.

It is also much faster and easier to cover large areas with a mechanical spreader.

How can you measure the amount of seed or fertilizer you are putting on?

There are 2 types of spreaders. Both have knobs that let you control the amount coming out.

They have numbers on a dial going from 0 to 20.

The bigger the number, the more seed or fertilizer will come out.

What is the correct setting for fertilizer?

Usually around "5". Be sure to read the directions on the spreader and on the bag of fertilizer. Both can be different. Check every time.

Answer the following questions:

Why do we use a mechanical spreader?

A. It is easier.
B. It is faster
C. It puts fertilizer on more evenly.
D. All the above are right.

The best answer is "D". If you picked another, re-read the information section.

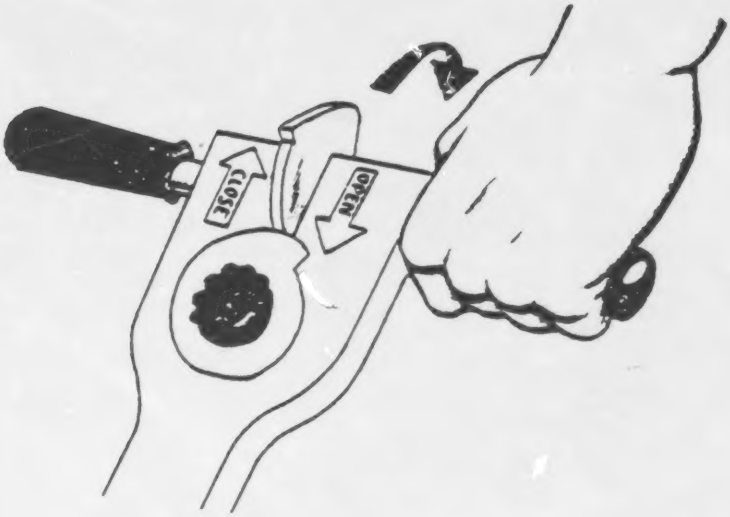
The larger the number on the dial that is set, ____________ fertilizer will come out.

A. The less
B. The same
C. The more
D. All of the above.

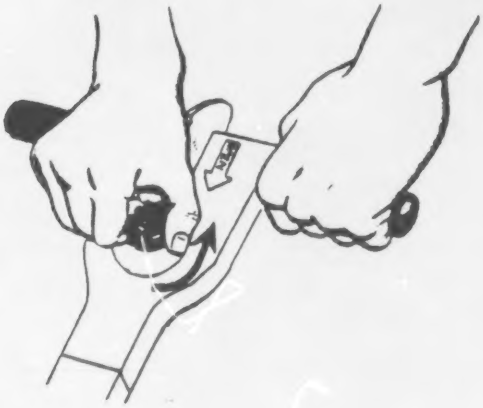
"C" is the correct answer. If you picked another, re-read the information section.

JOB STEPS

1. Turn handles to close. They are marked with an arrow.

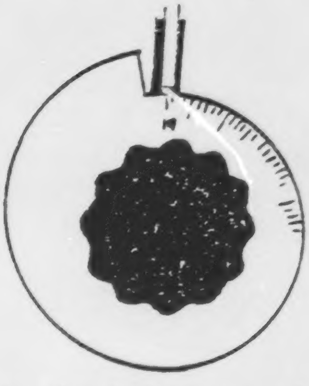


2. Turn the locking knob counter-clockwise to loosen.

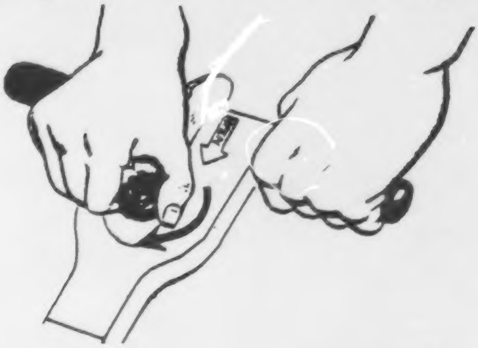


JOB STEPS

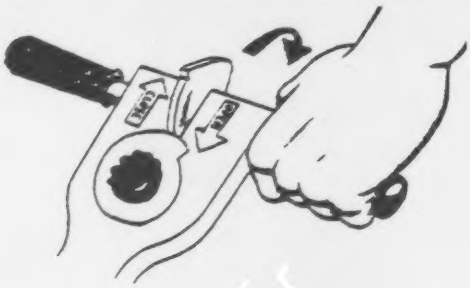
3. Move the dial face to the left until number 19 is in the center of the slot. This is on the handle.



4. Turn the locking knob clockwise to tighten.



5. Turn handles to open. They are marked with an arrow.



6. Turn the spreader upside down.
7. Look at how large the hole is.
8. Put the spreader on its wheels.
9. Turn handles to close.
10. Loosen black knob.

JOB STEPS

11. Turn dial until the number 4 is in the center of the slot.

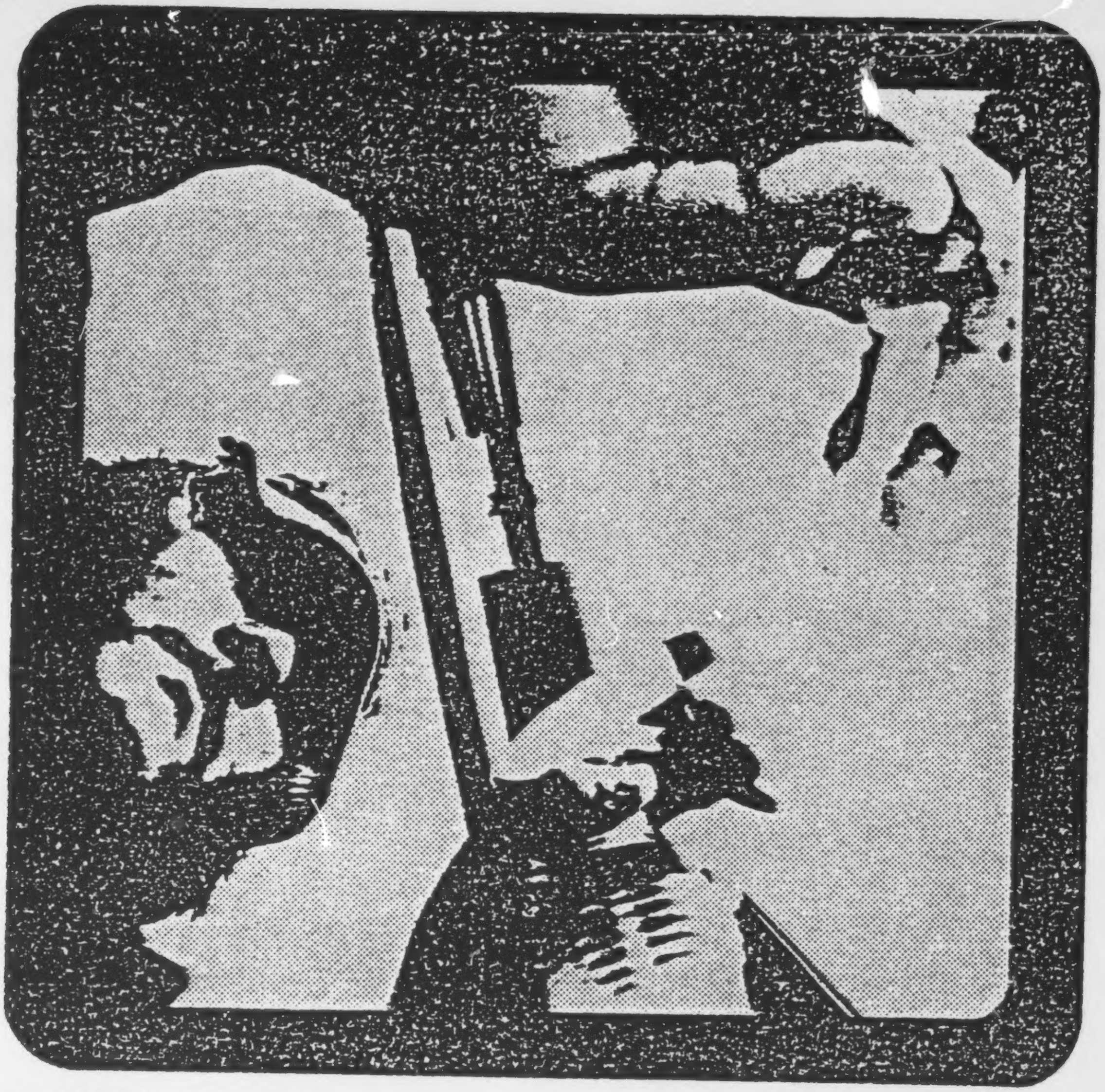
12. Tighten black knob.

13. Turn handles to open.

14. Turn spreader upside down.

15. Look at the size of the hole now. Compare 19 and 4.

16. Put spreader away.



building maintenance & engineering

unit: Grounds Maintenance

capital area career center

module: 2201 07 015 date: 1/10/77 level:

skill title: Fertilizing a Lawn

developed & written by: Daniel M. Woodward

visuals by: Bill Draper

WORD GUIDE

FERTILIZER - Plant food.

CONTROL LEVER - Located on handle. Controls the amount of fertilizer spread.

PERFORMANCE OBJECTIVE

You Are Going To Learn:

How to correctly spread fertlizer on a lawn.

And In Order To Do This You Will Need:

- Fertilizer
- Area of Lawn
- Mechanical Spreader
- Garden Hose - Nozzle

We Will Know You Can Do It When:

Fertilizer is evenly spread on the lawn according to directions on the container.

INFORMATION

Why do we fertilize lawns?

In order to make grass grow fast and become healthy.

What kind of fertilizer should we use?

Any that are sold in garden stores. Each may be a little different, but they all work. Just follow the directions on the bag.

How will I know how to set the spreader?

By following the directions on the fertilizer bag and by completing module 2201 07 014. This module shows you how to set a spreader.

NEVER FERTILIZE TOO MUCH.

Answer the following questions:

Fertilizing makes a lawn become ________.

A. Drier

B. Wetter

C. Healthier

D. Shorter

"C" is the correct answer.

How can you learn at what number to set the spreader.

A. On the fertilizer

B. Guess

C. On the spreader

D. Both A and C are right

"D" is the best answer.

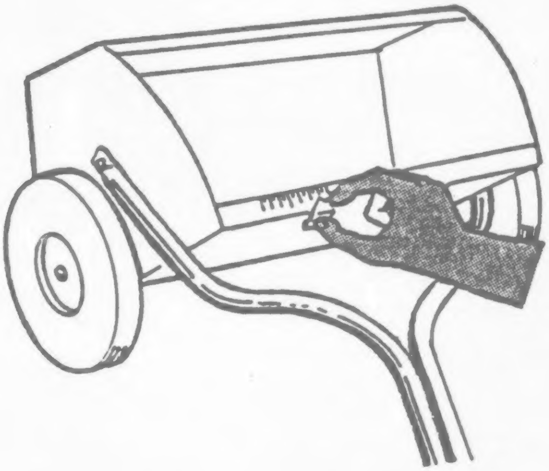
If you got either answer wrong, reread the information sheet.

JOB STEPS

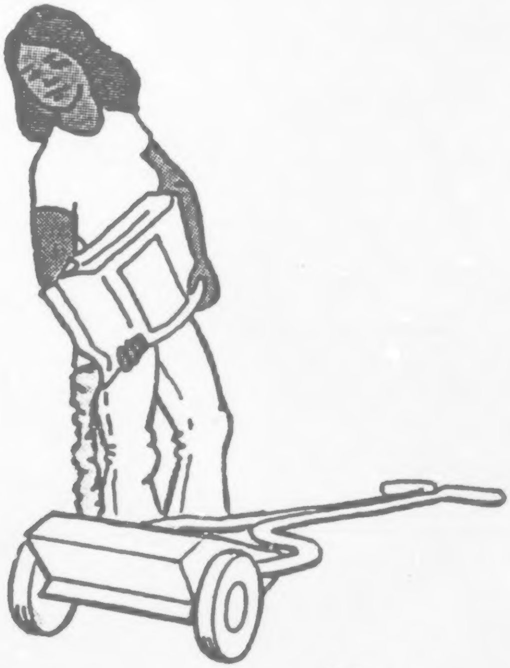
1. Close control lever on handle.

2. Find number setting on fertilizer bag.

3. Set dial on the spreader to the correct number.

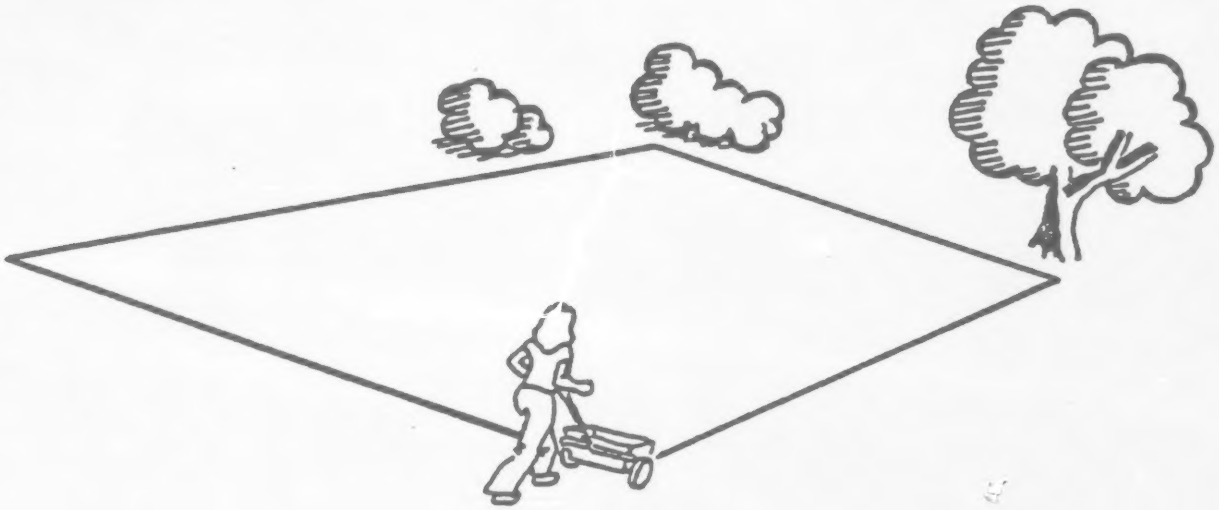


4. Fill the hopper of spreader with fertilizer.



JOB STEPS

[illegible]. Start at a corner of the lawn.

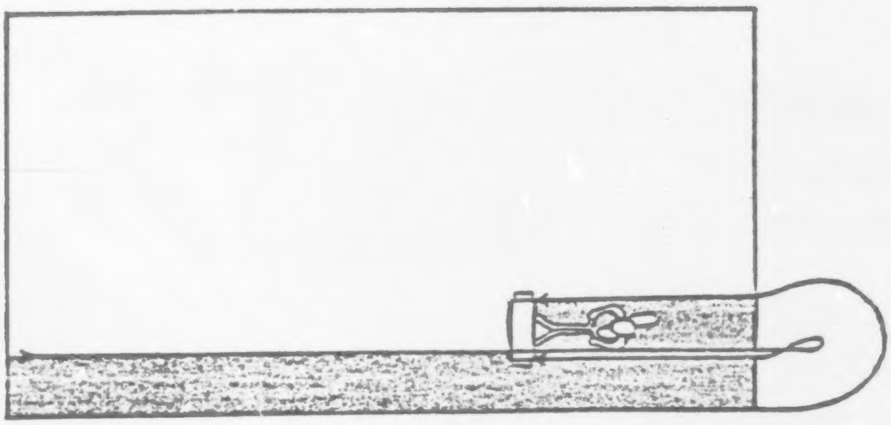


6. Open control lever and at the same time begin walking in a straight line.

7. As you come to the end of the row, close the control lever.

8. Turn around.

9. Line up spreader so the edge of the hopper covers the wheel mark made by the previous pass.



JOB STEPS

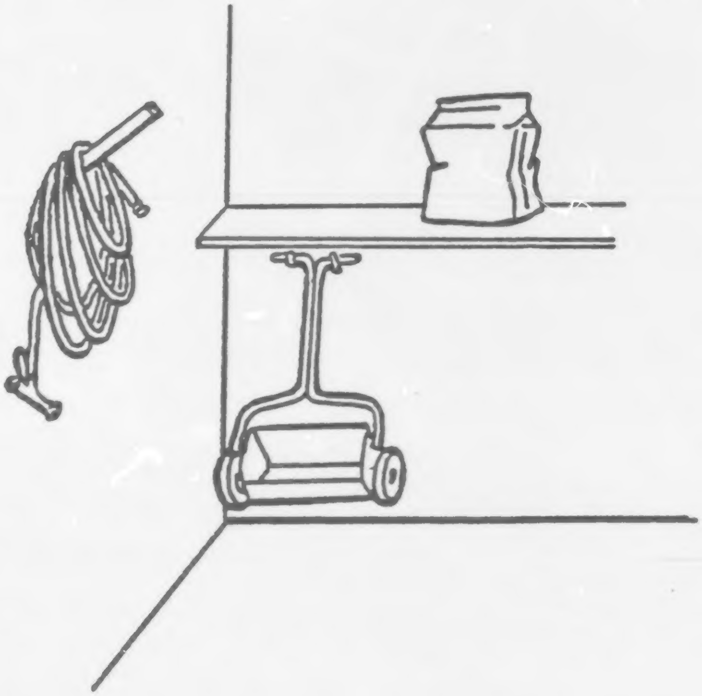
[illegible]. Open control lever and begin walking at the same time.

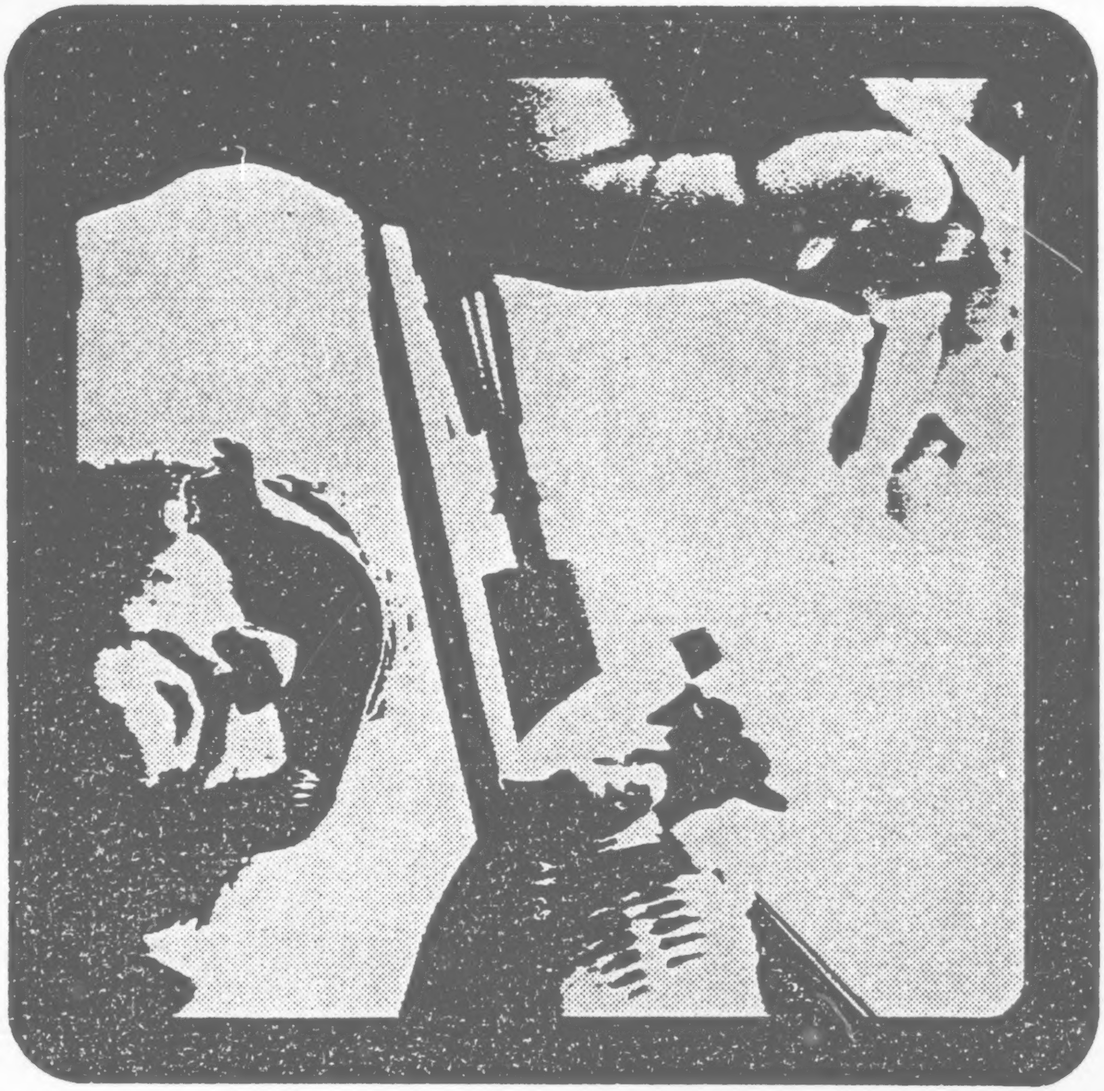
11. Close control lever when you reach the end of each pass.

12. Fertilize entire area.

13. Clean spreader with hose and nozzle. Open control lever and let water drain until no fertilizer is left. This is done because fertilizer left in spreader will cause spreader to rust.

14. Put tools away.





building maintenance & engineering

unit: Grounds Maintenance

capital area career center

module: 2201 07 016 date: 1-9-77 level: 1

skill title: Prepare Soil For New Lawn

developed & written by: Daniel M. Woodward

visuals by: Glen Cooley

WORD GUIDE

CLODS - Lumps of packed soil.

PREPARE - To get ready.

PERFORMANCE OBJECTIVE

You Are Going To Learn:

How to prepare soil for planting a new lawn.

And In Order To Do This You Will Need:

- shovel
- rake
- fertilizer (10-10-10)
- 10 foot rope
- small lawn tractor--cart
- level area of ground
- chain link mat (entrance mats)

We Will Know You Can Do It When:

You have completed the job steps and the soil has no stones or large clods of dirt.

INFORMATION	MATERIALS	LOCATION

Why do you prepare soil before you plant grass seed?

To help the grass seed grow. We want it to get started in the best way.

Couldn't you just rake it?

No, we have to turn the soil over with a shovel and remove all the stones.

Should we put some fertilizer on before planting the seed?

Yes, the best time to do this is when we are preparing the soil. All our tools are out.

Do we just dump a bag of fertilizer on the soil?

No, we will sprinkle it on and rake it in.

How much fertilizer should we use?

We will put in 3 pounds per 100 square feet.

What kind of fertilizer should we use?

Any brand name with the numbers 10-10-10 on the top of the bag.

NOW ANSWER THIS QUESTION:

How much fertilizer should we put in a 20 foot by 10 foot area when we are preparing it for seed?

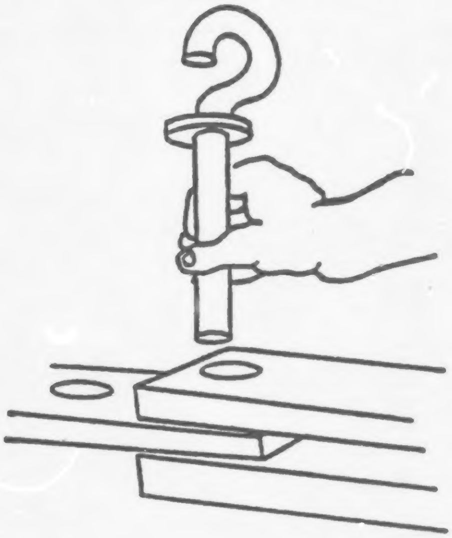
A. 3 pounds
B. 6 pounds
C. 9 pounds
D. 1 1/2 pounds

Hope you picked "B". It is a 200 square foot area.

NOTE: You should study module 2201 07 010 before starting the Job Steps. It will show you how to use a small lawn tractor.

JOB STEPS

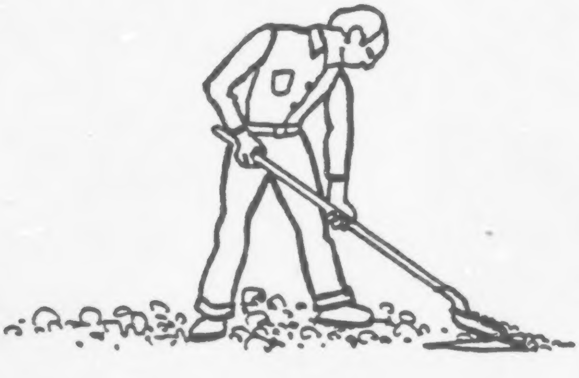
1. Hook the cart on the back of the tractor. Put the pin in the hole.



2. Put all your tools in the cart.

3. Drive the tractor to the area you are going to prepare.

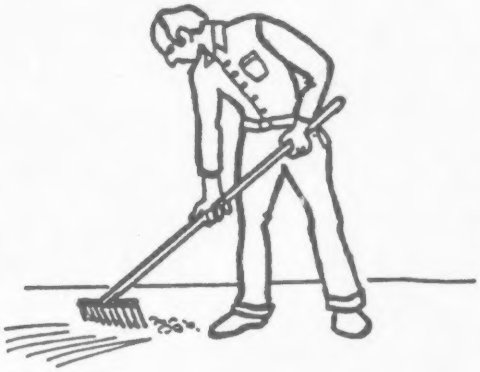
4. Take the shovel and turn over the soil. Break up the clods as you turn them over.



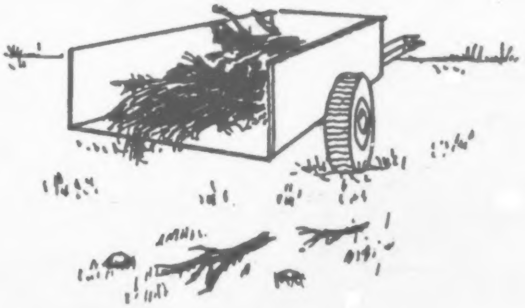
JOB STEPS

5. Turn over the whole area of ground.

6. Rake the area to break up the clods into smaller parts. They should be no bigger than a quarter.



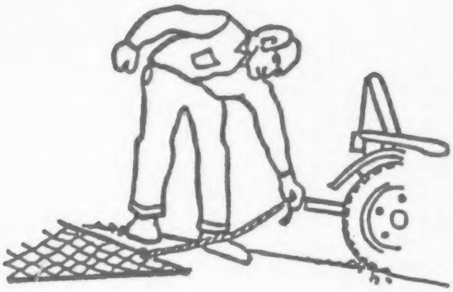
7. Pick up all large stones, sticks and weeds. Put them into cart.



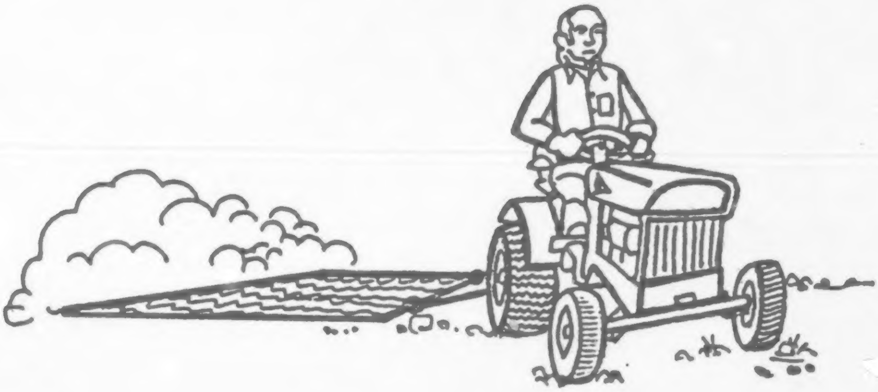
8. Take cart off.

JOB STEPS

9. Tie the chain link mat on to the tractor.



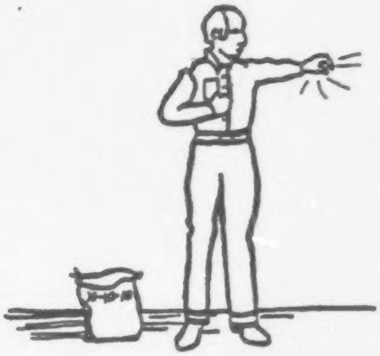
10. Drive tractor all around the area of ground. This will smooth out the soil.



11. Remove any stones, sticks or weeds and put into cart.

JOB STEPS

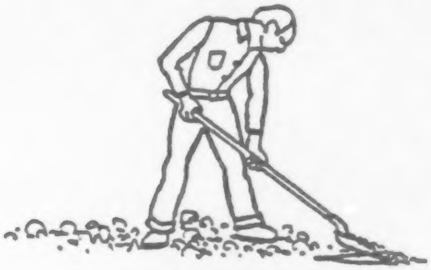
12. Sprinkle fertilizer over the area.



NOTE: If you have a large area of ground, you may want to put the fertilizer on with a mechanical spreader. If you do, complete modules 2201 07 014 and 2201 07 015.

13. Rake the fertilizer into the soil.

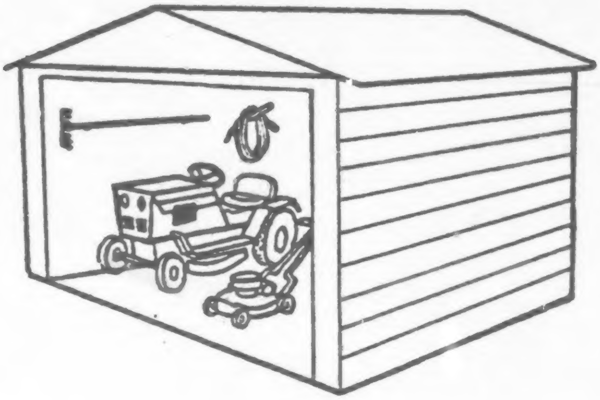
14. Using the shovel, fill in any low spots.

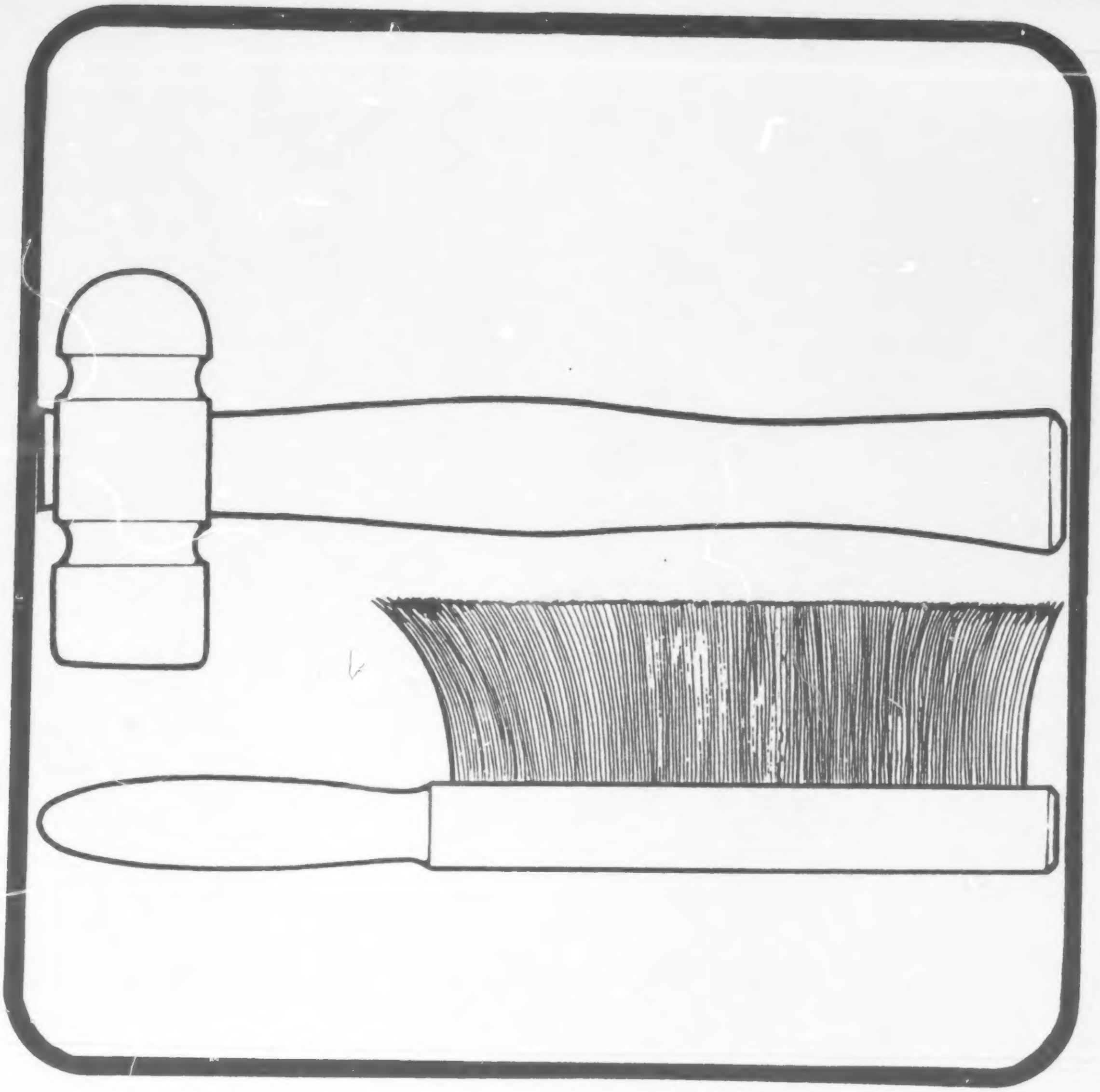


JOB STEPS

15. Smooth with rake.

16. Put your tools away.





building maintenance & engineering

unit: GROUNDS

capital area career center

module: 2201 07 017 date: January 1977 level: I

skill title: Planting a New Lawn

developed & written by: Daniel M. Woodward

visuals by: Bill Draper

WORD GUIDE

QUALITIES - Good and bad points

PERFORMANCE OBJECTIVE

You Are Going To Learn:

How to plant a new lawn

And In Order To Do This You Will Need:

Mechanical Seeder

Rake

Light Roller (50 pounds)

Garden Hose and Nozzle

Grass Seed

Straw

A Prepared Area of Land

We Will Know You Can Do It When:

You have completed the job steps and have planted grass seed so that the seed is evenly spread.

INFORMATION	MATERIALS	LOCATION
How do I prepare the soil before I begin to seed a new lawn?		
By completing Module 2201 07 016. This module shows you how to prepare the soil before planting.		
A mechanical seeder is needed. How will I know how to use that?		
By completing Module 2201 07 014.		
There are many types of grass seeds. Below you will see the qualities of some good seeds for this area.		
Merion Blue Grass - It will not take much wear. If many people will be walking on it, don't use this seed.		
Plant - 2 pounds per 1000 square feet of soil.		
Kentucky Blue Grass - This will take more wear and is very popular in this area. Grows well in the summer.		
Plant - 3 pounds per 1000 square feet.		
Red Fescue - Can take a lot of wear. It is not as pretty as the blue grass types. It grows well in shady areas.		
Plant - 3 pounds per 1000 square feet.		

INFORMATION	MATERIALS	LOCATION

Rye Grass - Costs less money. It grows very fast. It dies over the winter. Many people plant rye first and then plant a better seed 2 weeks later. This way, they will have a lawn sooner. You Must Replant when using Rye.

Plant - 4 pounds per 1000 square feet.

NOW DO

If you were going to plant a lawn where it was shady and many people were going to walk on it, what type of seed would you use?

A. Merion Blue
B. Red Fescue
C. Rye
D. Kentucky Blue

Hope you picked "B".

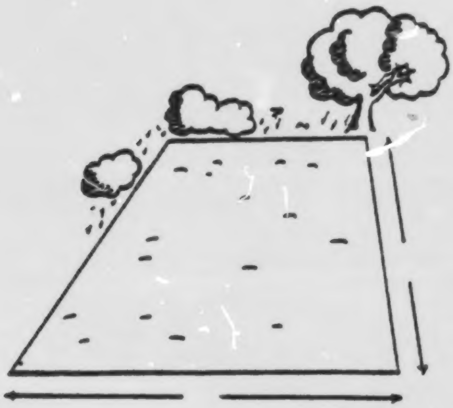
What kind of seed would you use for a lawn that you wanted soon?

A. Merion Blue
B. Kentucky Blue
C. Red Fescue
D. Rye

Did you pick "D"? Remember that you will have to replant when using rye.

JOB STEPS

1. Find out how large the area to be seeded is.



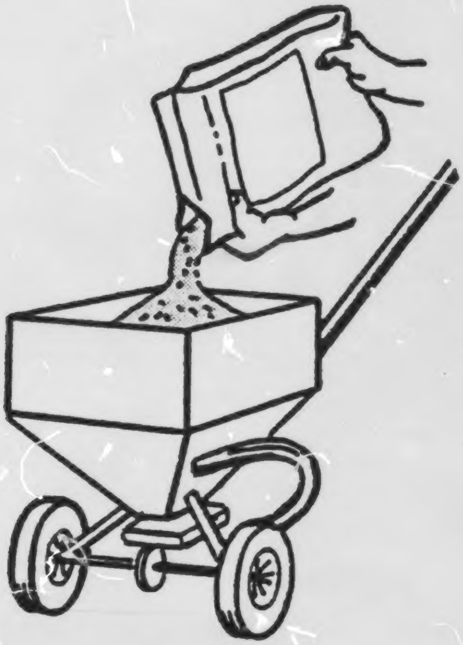
To find the area, multiply one side by the other.

20 feet x 25 feet = 500 square feet

25 feet
x20 feet
500 square feet

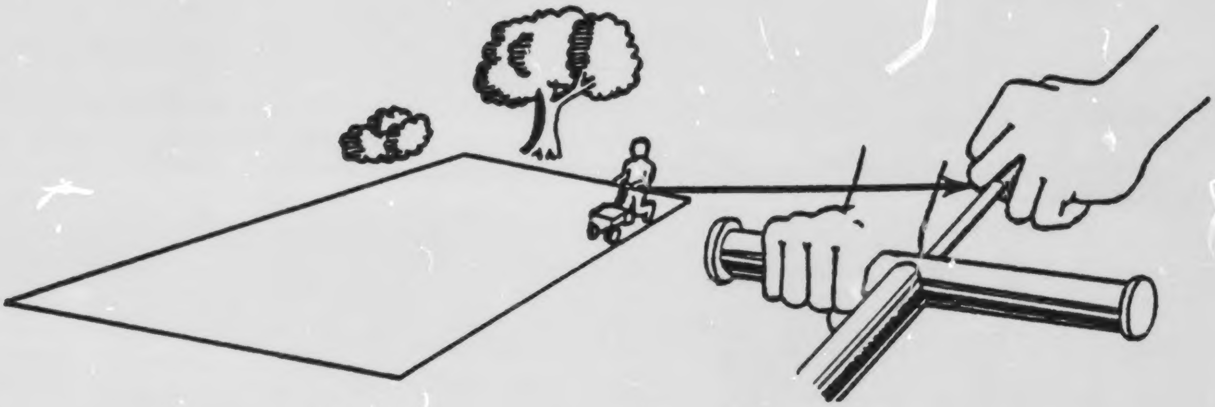
2. Set Mechanical Seeder to the right setting. (See directions on seeder).

3. Pour grass seed into the seeder.



JOB STEPS

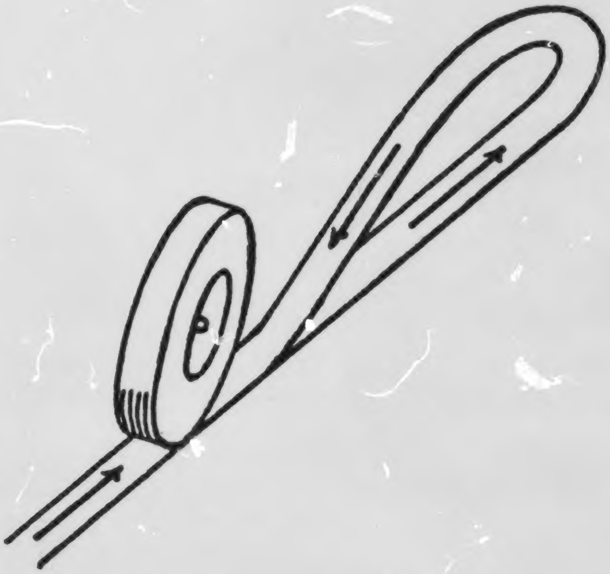
4. Start at 1 corner and walk to the other corner in a straight line. As you begin, open the control lever on the seeder.



5. When you reach the other side close the control lever.

6. Turn around.

7. Put the wheel inside the wheel mark of the last pass.

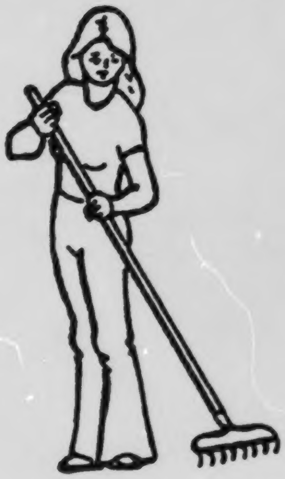


JOB STEPS

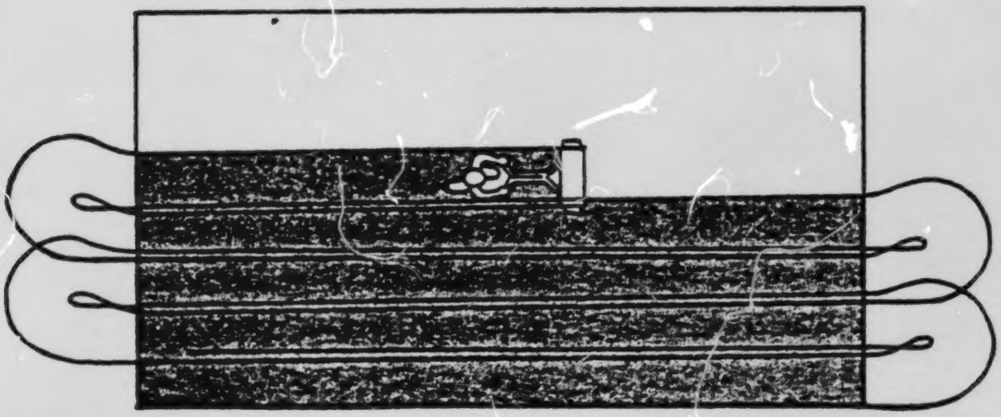
8. Open control lever and go back and forth until all of the area is done.

   NOTE: Be sure to close the lever when you turn around.

9. Gently rake the seed into the soil.

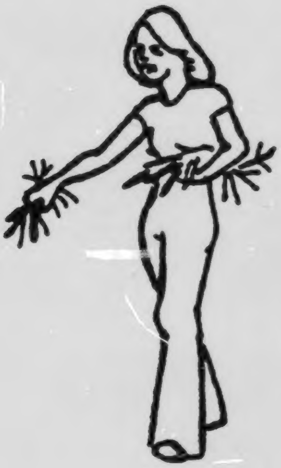


10. Roll the seed into the soil over the whole area.



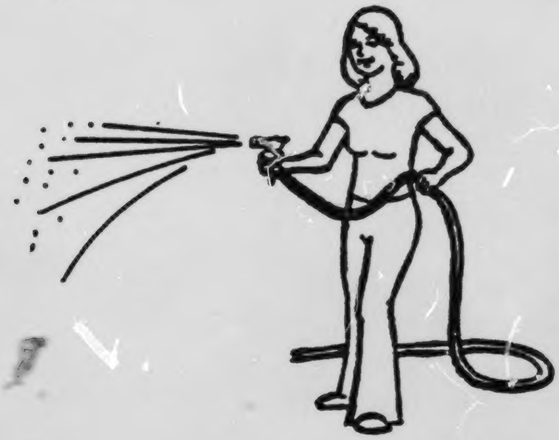
JOB STEPS

11. Spread the straw lightly over the whole area. (This keeps the soil moist).



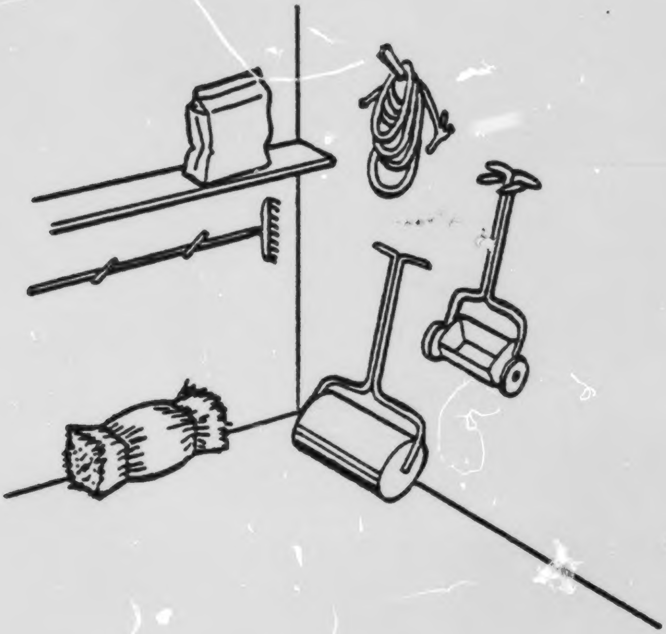
12. Sprinkle the area with a garden hose and nozzle. Use a fine spray.

NOTE: Do not mow the new grass until it is at least 3 inches tall.



JOB STEPS

13. Clean and return your tools.



building maintenance & engineering

unit: Grounds Maintenance

capital area career center

module: 2201 07 018 date: 1/9/77 level: _____

skill title: Setting up a transit

developed & written by: Daniel M. Woodward

visuals by: Bevan Suits

WORD GUIDE

TRANSIT - Used to make measurements at far distances.

TRIPOD - 3-legged support for transit.

SIGHT BARREL - A tube that makes objects look closer.

DELICATE - Something which can break easily.

READINGS - Measurements made by using a transit.

PERFORMANCE OBJECTIVE

You Are Going To Learn:

How to set up a transit.

And In Order To Do This You Will Need:

Tripod

Transit

We Will Know You Can Do It When:

You have completed the job steps and the transit stays level as the sight barrel is turned.

INFORMATION	MATERIALS	LOCATION OF MATERIALS

Why do we have to set up a transit correctly?

> To be able to get correct readings. If it is not level or if the tripod moves, it makes our readings wrong.
>
> A transit is a very delicate instrument and must be handled with care.

If a transit is not level or if the tripod moves, it ________.

A. Will be hard to see through.

B. Makes too much noise.

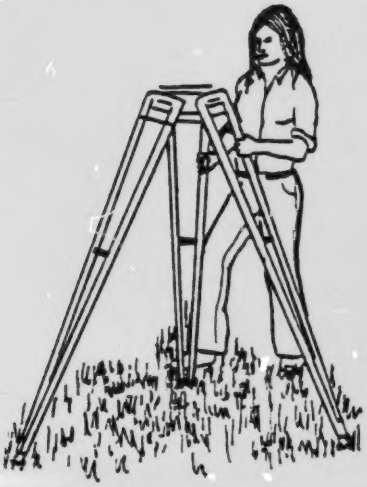
C. Puts strain on the wing nuts.

D. Makes our readings wrong.

Did you pick "D"? If not, reread the information section.

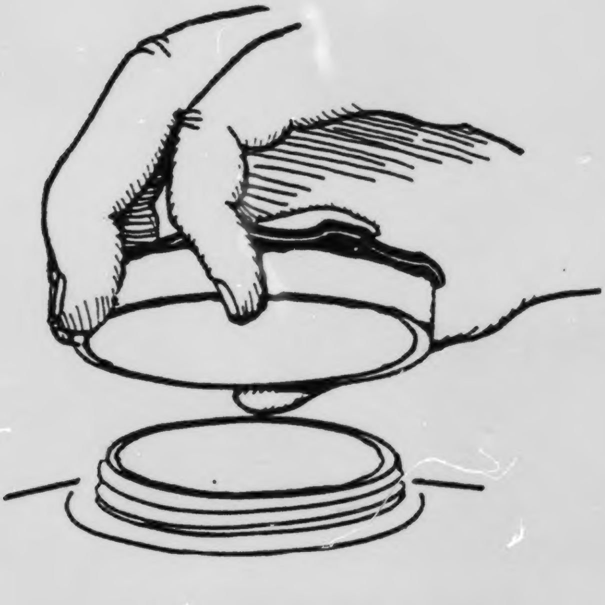
JOB STEPS

1. Set up tripod so that transit is as level as possible.



2. Tighten the wing nuts at the top of each leg.

3. Take off the plastic cap from top of tripod and put in case.



WORD GUIDE

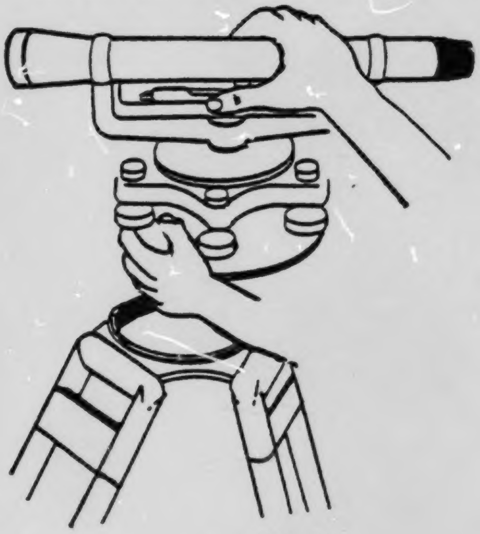
CLOCKWISE - To go in the same direction as the hands of a clock.

COUNTER CLOCKWISE - To go in the opposite direction.

JOB STEPS

4. Turn the transit base counter-clockwise from case. Use both hands.

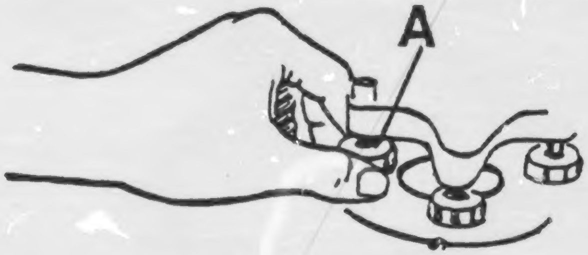
5. Place transit on the mounting screws on top of the tripod.



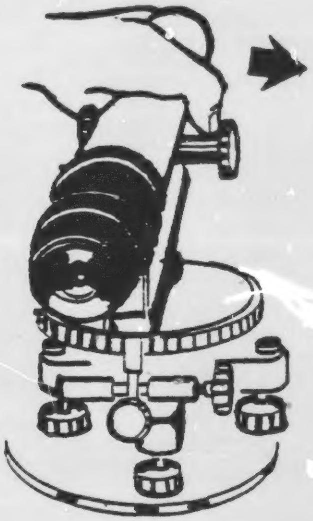
6. Turn transit clockwise to tighten.

JOB STEPS

7. Turn thumb screw marked "A" counter-clockwise.

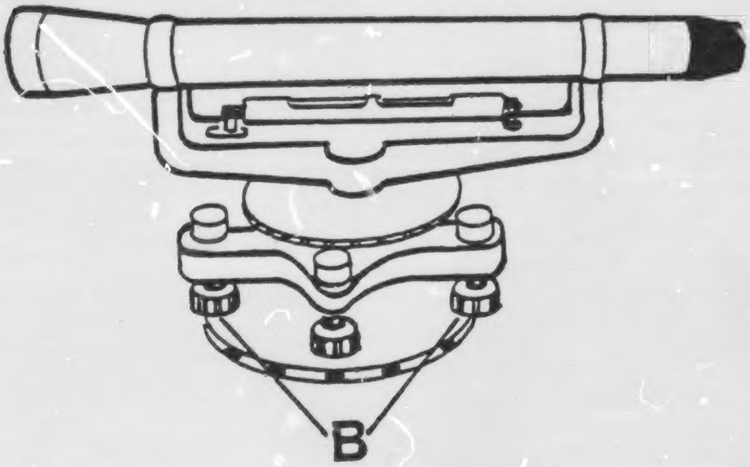


8. Sight barrel should turn easily in any direction.



JOB STEPS

9. Turn sight barrel and line it up with the 2 thumb screws marked "B".

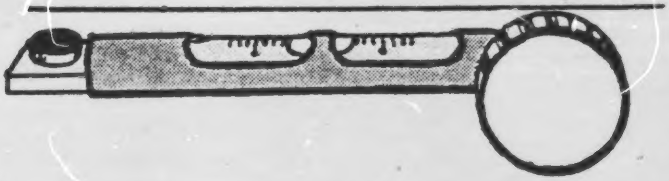


10. Put both of your thumbs on the 2 "B" thumb screws.

11. Turn the thumb screw in your left hand clockwise and the thumb screw in your right hand counter-clockwise at the same time.

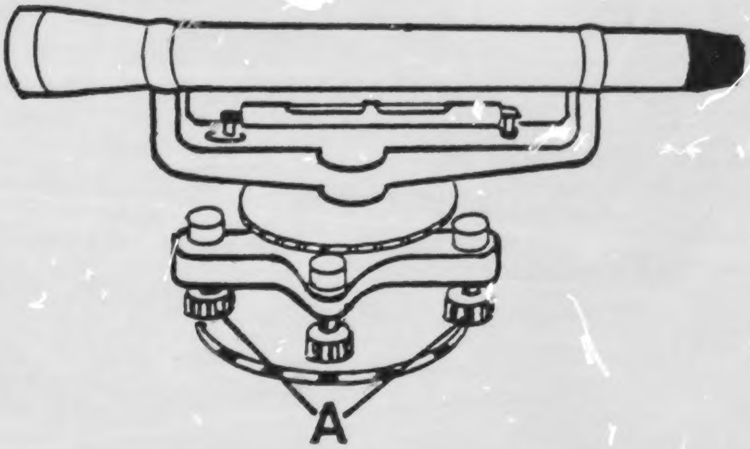
12. Look at the bubble under the sight barrel.

13. Keep turning the thumb screws until the bubble is between the 2 dots.



JOB STEPS

14. Turn the sight barrel and line it up with the other 2 thumb screws.

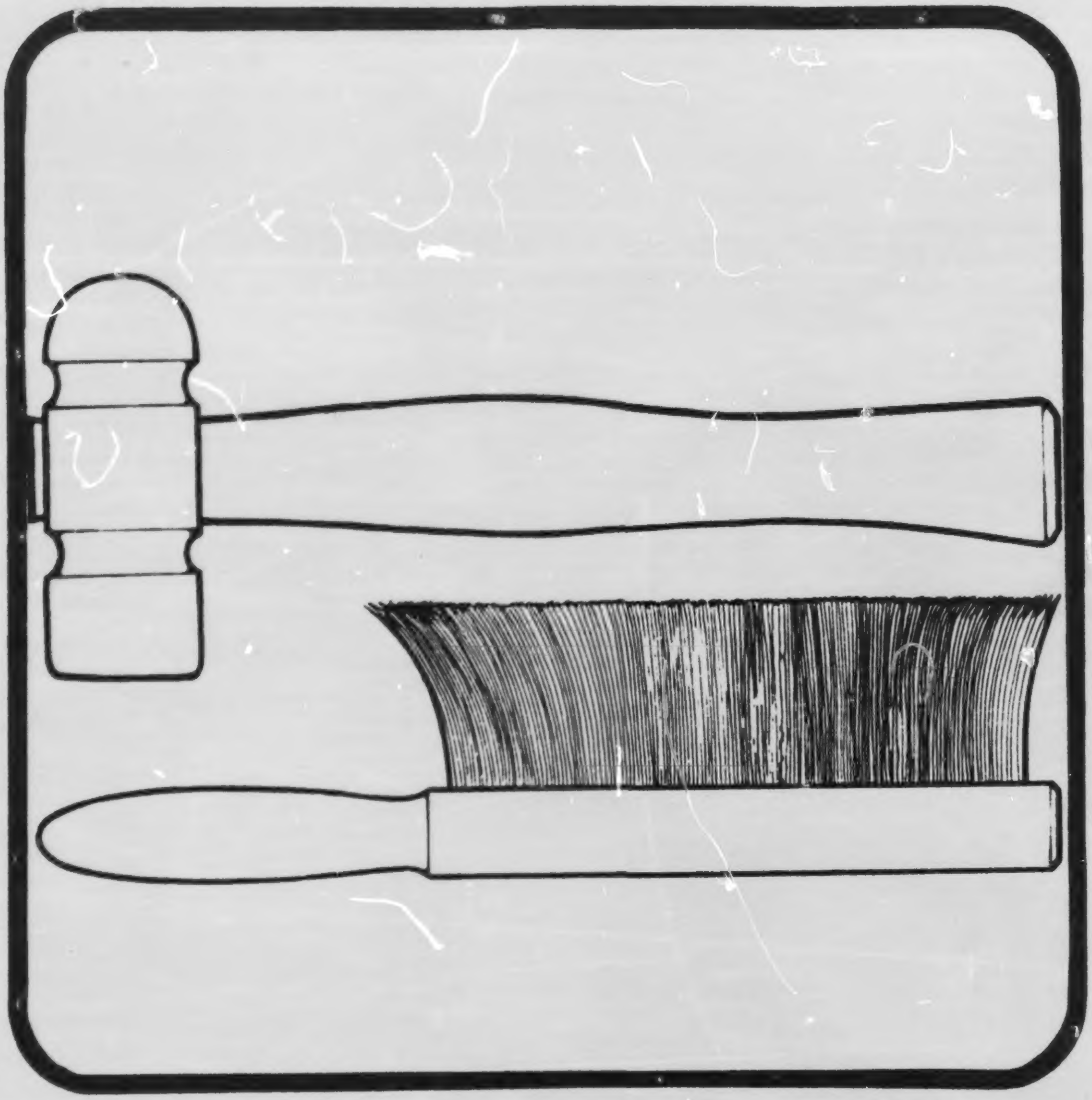


15. Turn thumb screws and line up the bubble between the two dots.

16. Keep going from 1 set of thumb screws to the other set. Adjust the bubble each time.

17. Turn sight barrel all the way around. Make sure bubble is between dots.

18. Ask your instructor to check transit for level setting.



building maintenance & engineering

unit: GROUNDS

capital area career center

module: 2201 07 019 date: January 1977 level:

skill title: Edging a Lawn

developed & written by: Daniel M. Woodward

visuals by: Sandra Gostomski

WORD GUIDE

EDGE - Trim grass along lawn and sidewalk - where the two meet.

CLIPPINGS - Cut grass.

PERFORMANCE OBJECTIVE

You Are Going To Learn:

How to edge a lawn.

An In Order To Do This You Will Need:

Lawn Edger	Push Broom
Flat Shovel	Waste Can

We Will Know You Can Do It When:

You have safely completed the job steps and the sidewalk is edged straight and 3 inches deep.

INFORMATION	MATERIALS	LOCATION OF MATERIALS

Why do we edge a lawn?

To cut or trim grass that grows from the lawn onto the sidewalk or the driveway.

It makes the lawn and building look better.

What kinds of edgers are there?

There are 3 kinds: Hand, electric, and gasoline. Each is different and many companies make them. You should read the owners' manual carefully before you start to edge.

We will be using a gasoline type.

Is edging dangerous?

It can be. The electric and gasoline cutter blades move very fast and throw stones when cutting.

```
*************************************
* CAUTION!  Do not put your hands   *
*           near the cutter blades. *
*************************************
```

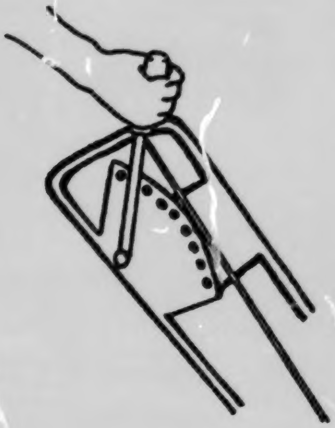
Try to keep people from standing around the edger while it is running.

JOB STEPS

1. Fill gas tank on front of edger with gasoline.

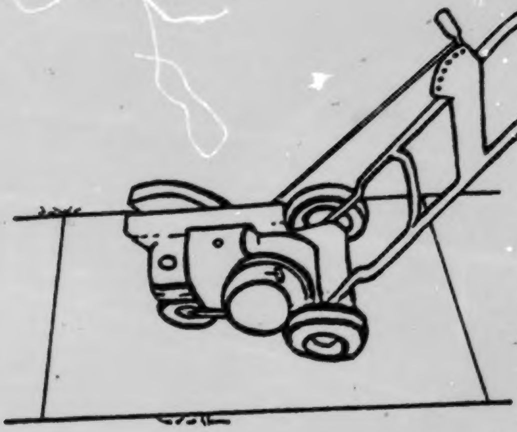
2. Take lawn edger to area to be edged.

3. Pull up lever on handle.



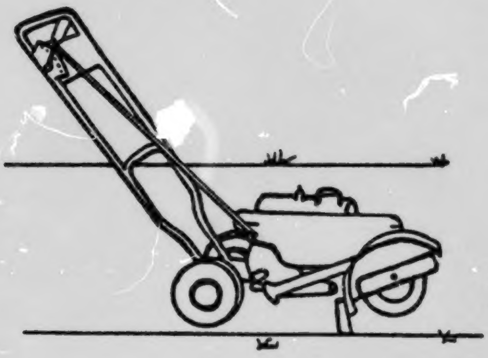
4. Start engine - pull rope.

5. Line up edger so that the 3 wheels are on the sidewalk.

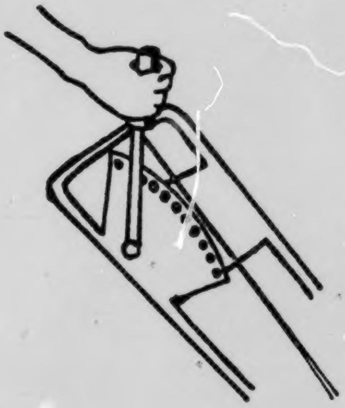


JOB STEPS

6. Move just a little so the guide is touching the edge of the sidewalk or driveway.



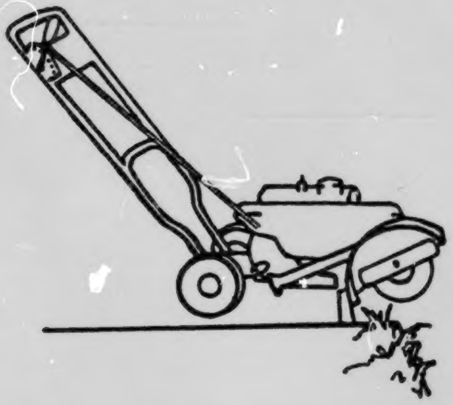
7. Lower cutting blade by pulling lever to the left and and put it in the 4th hole from the bottom.



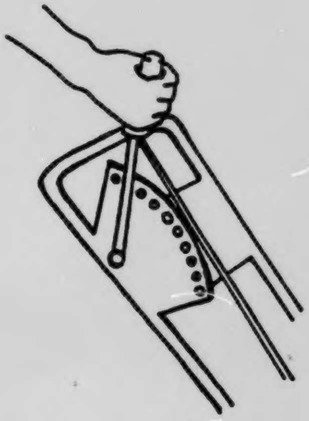
8. Slowly push edger forward.

JOB STEPS

9. Keep guide on the edge of the sidewalk or driveway.



10. Be careful if you come near a cross walk. Do not let the cutter blade hit.



11. Lift the cutter blade by pulling lever up and move edger onto the other side of the sidewalk.

12. Do job steps 5, 6, 7, and 8 again.

JOB STEPS

13. Do all edging needed by doing all job steps.

14. Stop engine.

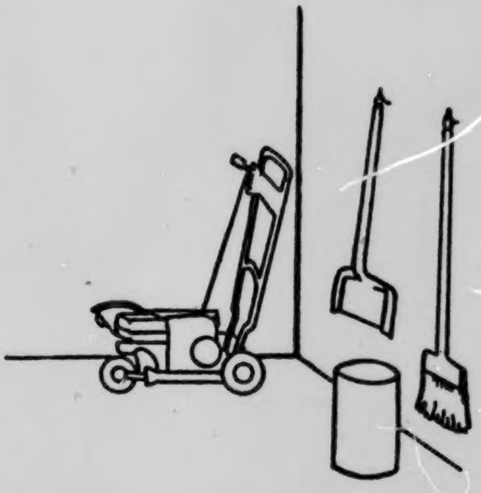
15. Sweep clippings into piles.

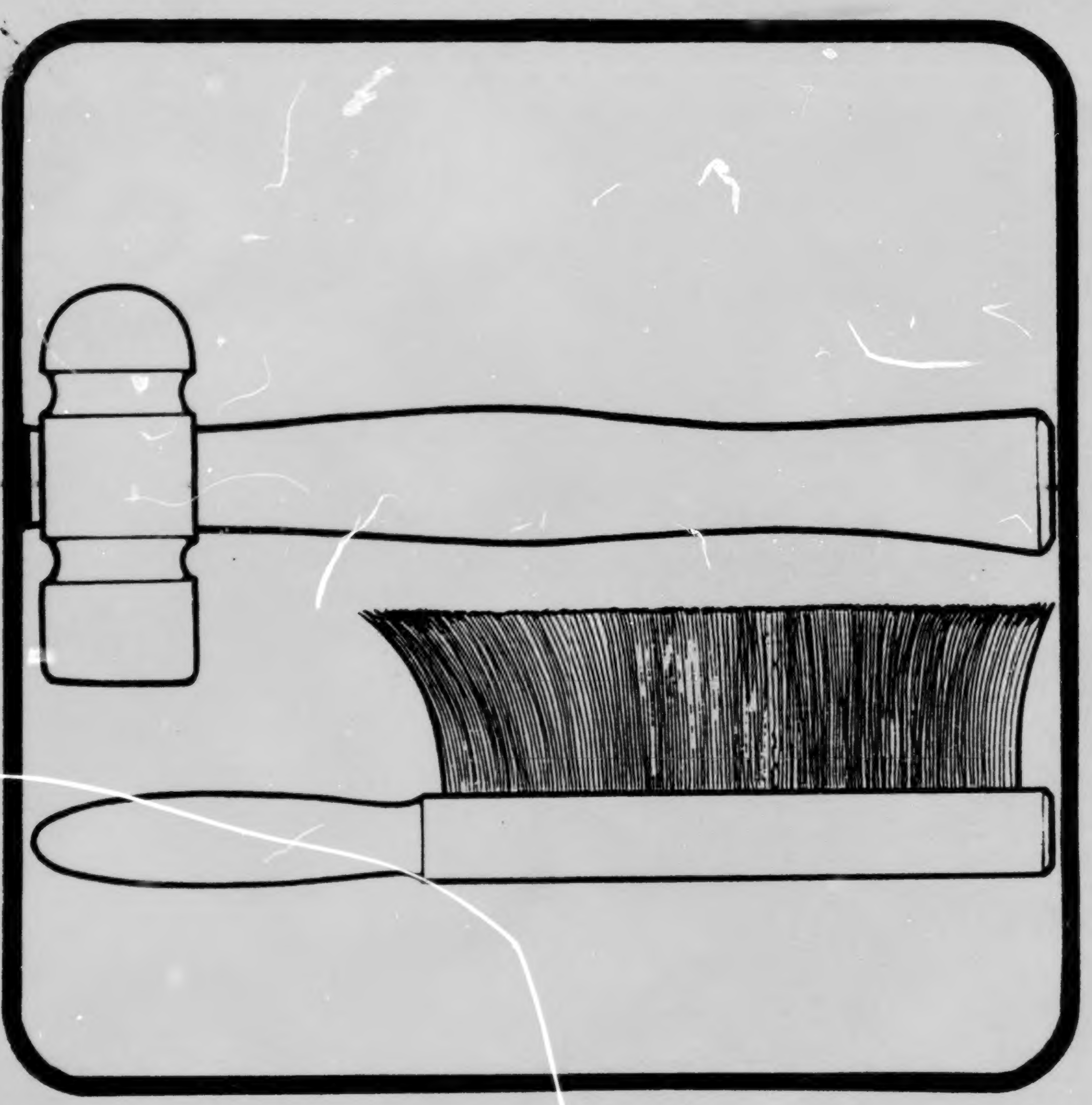
16. Sweep piles onto flat shovel.

17. Carry shovel to waste can and dump clippings in the can.

18. Dump the waste can into plastic bags or where instructor tells you.

19. Put edger, waste can, push broom, and shovel away.





building maintenance & engineering

unit: GROUNDS

capital area career center

module: 2201 07 020 date: October 1977 level:

skill title: Constructing Forms (For New & Replacing)

developed & written by: Buster Crabb

visuals by: Chuck Knock

PERFORMANCE OBJECTIVE

YOU ARE GOING TO LEARN:

How to construct a form for common concrete jobs.

AND IN ORDER TO DO THIS YOU WILL NEED:

Hammer
Nails (size will depend on thickness of lumber)
Lumber (depending on type of form needed)
Shovel
Sledge hammer (short handle)
Level
Tape measure
Stretch line
Stakes (1" stock x 18" long)
Equipment checklist
Hand saw

WE WILL KNOW YOU CAN DO IT WHEN:

You have laid out the area and constructed a form for cement.

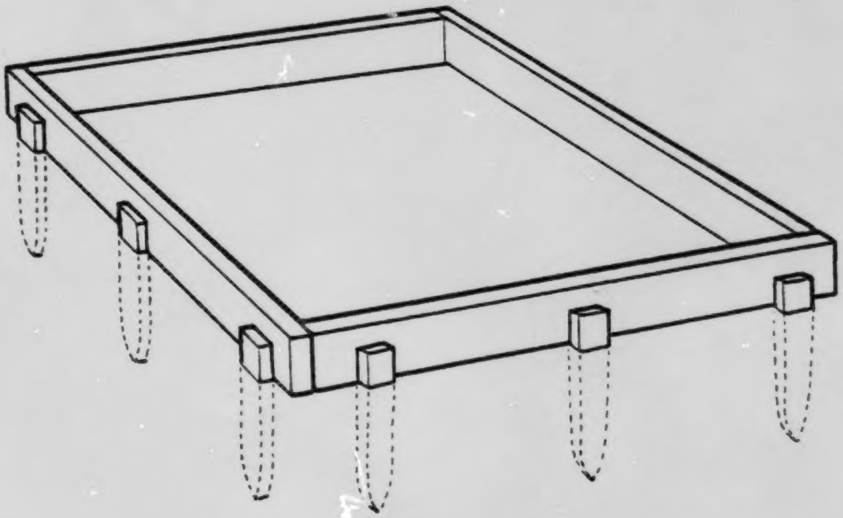
WORD GUIDE

UNIFORM - the same all the way through

INFORMATION

Forms are made out of 2" x 4" pieces of wood and stakes are cut 18" long from 1" stock. They hold the wet (liquidy) cement at certain levels. When the forms are removed, the concrete is neat and evenly spread.

Below is an example of a form.

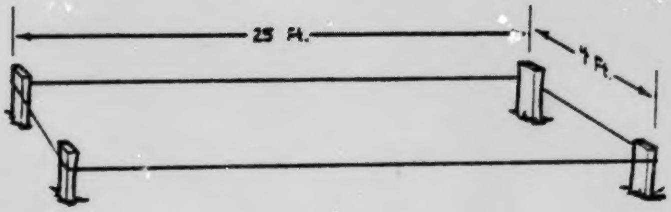


WORD GUIDE

JOB STEPS

1. Take all equipment and materials to your work area.

2. Lay out the area with string and stakes.

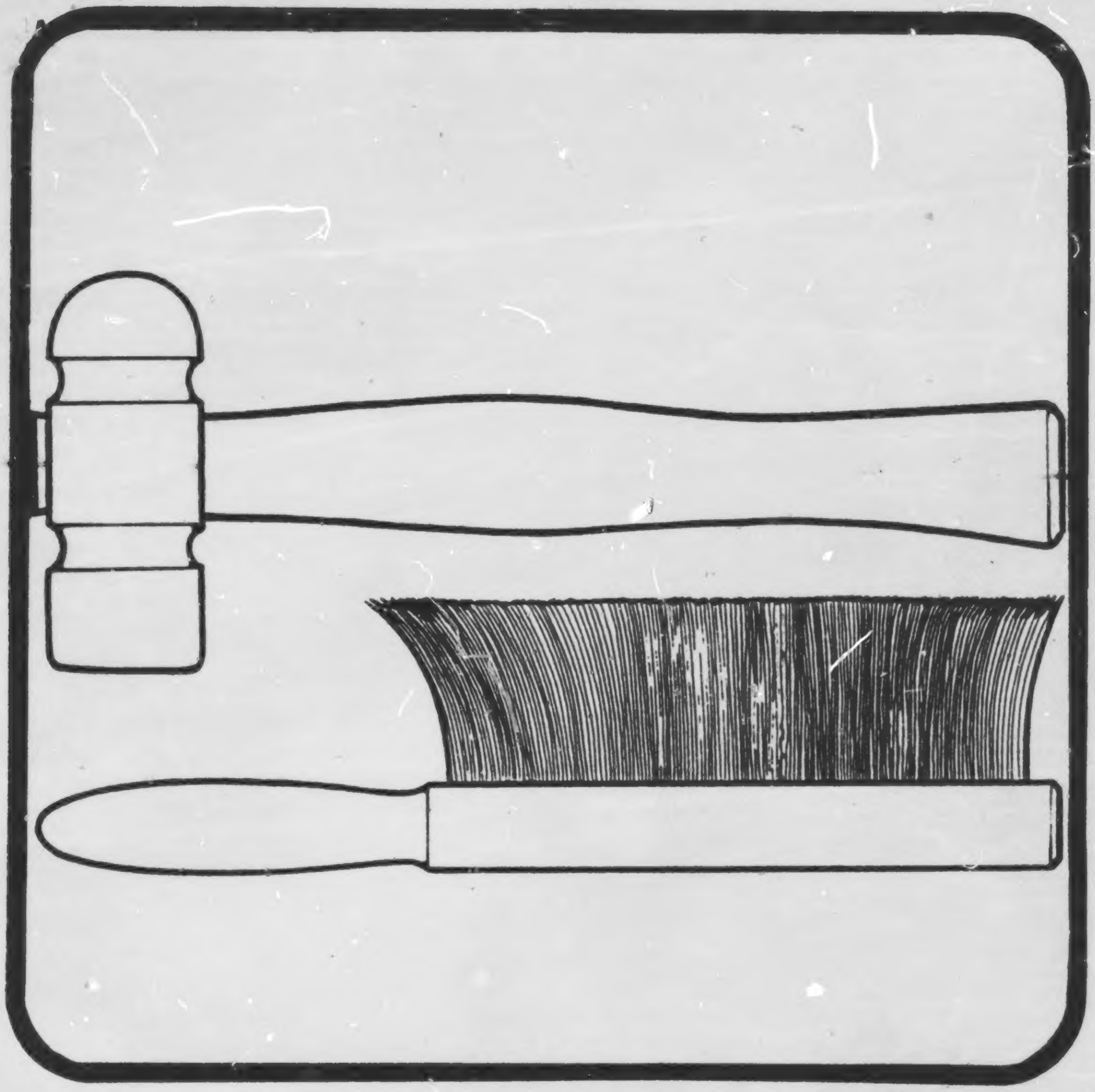


3. Dig out the dirt 4 or 5 inches below ground level.

4. Fill low spots with dirt and stamp firmly, making bottom smooth and level.

5. Place stakes at each joint in the form and then about every 2 feet.

6. Place a 2" x 4" piece long enough to reach across the width of the form and lay it on edge.



building maintenance & engineering

unit: GROUNDS

capital area career center

module: 2201 07 021 date: October 1977 level:

skill title: Finishing Concrete (Troweling & Curing)

developed & written by: Buster Crabb

visuals by: Dave Brown

PERFORMANCE OBJECTIVE

YOU ARE GOING TO LEARN:

How to finish concrete by trowling and curing.

IN ORDER TO DO THIS YOU WILL NEED:

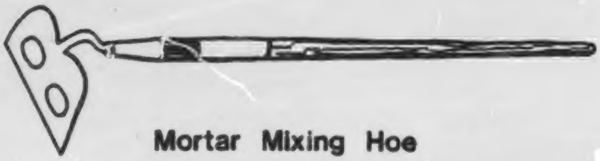
Hammer
Shovel
Steel trowel (finishing)
Hand float
Bull float
Level
Wood float
Garden Hose
Edger
Jointer
Concrete floor broom
Tape measure
1" x 12" board
Burlap or canvas
Polyethylene sheeting
Soaker hose

WE WILL KNOW YOU CAN DO IT WHEN:

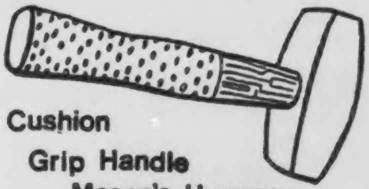
The concrete if finished as required and the curing is complete.

INFORMATION

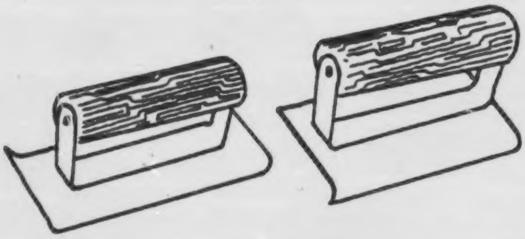
These are pictures of some of the tools you will need for this job.



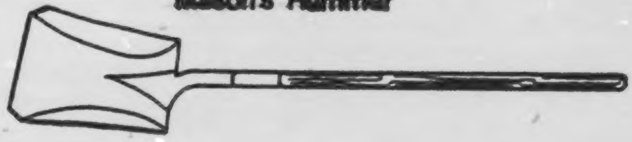
Mortar Mixing Hoe



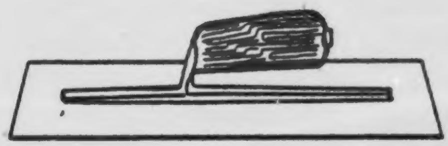
Cushion
Grip Handle
Mason's Hammer



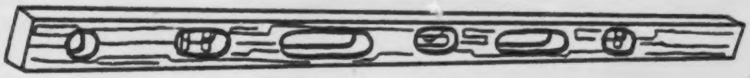
Stainless Steel Edgers
with curved ends



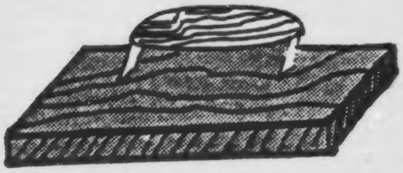
Shovel



Trowel



Mason's Level



Wood Float for Coarse Finish

INFORMATION

FINISHING - Decide on what type of finish you desire:

1. exposed aggregate
2. even or gritty surface
3. smooth surface
4. broomed finish
5. wood float finish

CURING - The most important concrete operation and often the most forgotten. Concrete must be protected from drying out by being exposed to the sun or by wind. Concrete must cure for at least six (6) days.

CONCRETE - REMEMBER -- Concrete does not dry immediately; it sets because of a chemical reaction between cement and water.

WORD GUIDE

RESUME - begin again

JOB STEPS

NOTICE #1: After concrete is poured and leveled to the height of your form, proceed to step #1

FINISHING:

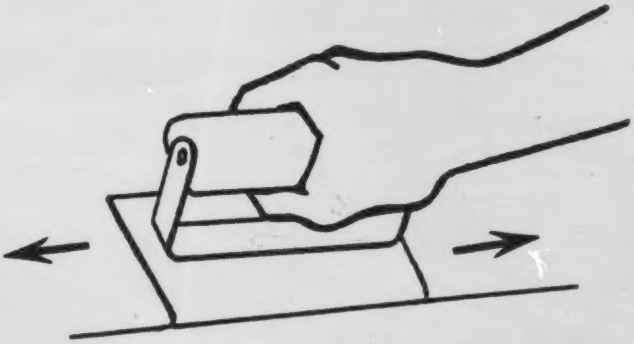
1. Take your equipment and materials to your work area.

2. Take your wooden trowel and lay it flat, handle upward, on the cement surface and begin smoothing the cement surface.

3. Remove extra cement in your form by pushing it off the side of your form with your wooden trowel. Then continue troweling until the cement is leveled to your desire.

NOTICE: If water begins to form on top of cement, stop troweling: after water has either drained off or been removed, then continue troweling to desired finish.

4. Take your edger tool and begin edging your cement. Put the curved edge along the edge of the 2" x 4" form and, with an even pressure (light to medium), move the edger forward and backward to make a smooth edge.



NOTICE: If the cement begins to stick to the trowel, dip trowel into clean water, snap trowel to remove excess water, and then resume troweling.

JOB STEPS

5. If troweling is complete, then clean the tools in clean water and dry with a cloth.

CURING:

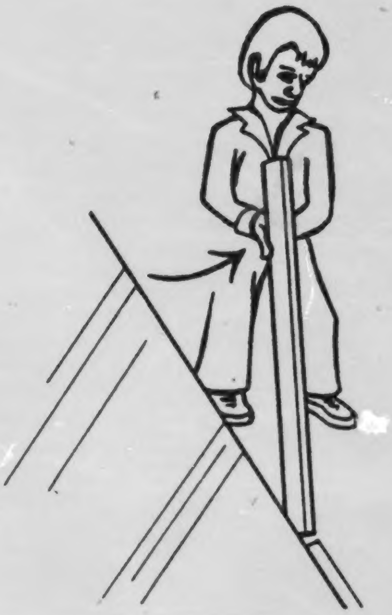
1. **When concrete begins to dry out, do the following:**

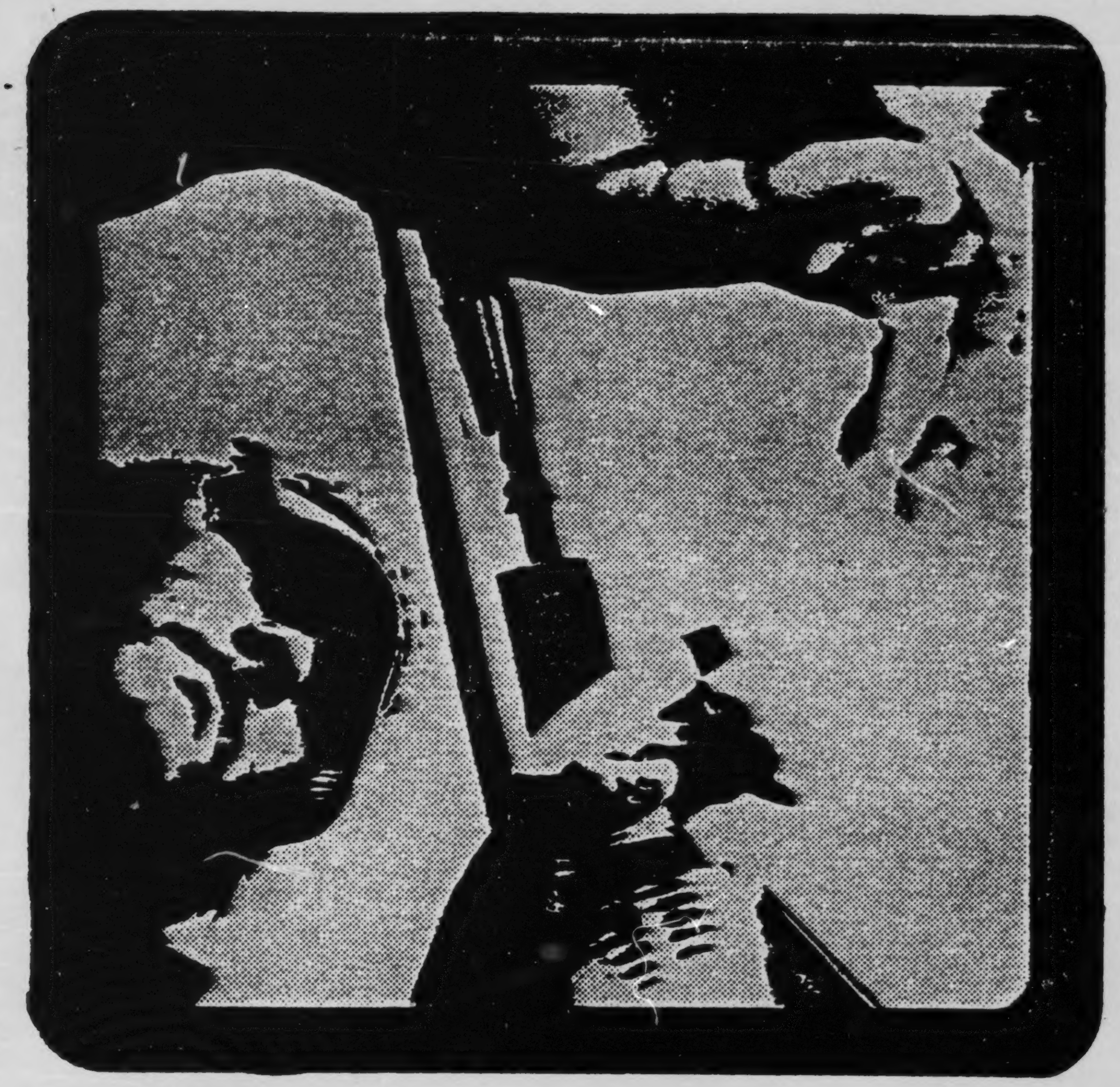
   A. fine spray the concrete with a hose a couple times a day for at least a week.

   B. after the surface has set fairly hard, you can also lay a burlap covering (also canvas or straw) over the concrete and fine spray the same as in step 1A.

2. After the sixth day, concrete should be cured enough for you to remove any coverings and the forms.

3. Be extra careful on the removal of the forms. Start at one end and work to the other end, by prying loose one joint and then lifting outward and up. This way you will not break or chip any of the edges or corners.





building maintenance & engineering

unit: Maintenance

capital area career center

module: 2201 08 1 date: 1/21/77 level: 2

skill title: Collecting Papers and Trash

developed & written by: Dwight Smith

visuals by: Dave Wehrwein

WORD GUIDE

NONCOMBUSTIBLE - Will not burn. Such as as glass or metal.

PERFORMANCE OBJECTIVE

YOU ARE GOING TO LEARN:

How to collect trash and papers.

AND IN ORDER TO DO THIS YOU WILL NEED:

- 4 wheel push truck
- Dust pan
- Dust pan brush
- Gloves
- Wiping cloths
- Container for noncombustible trash
- Twine
- Trash bag liners

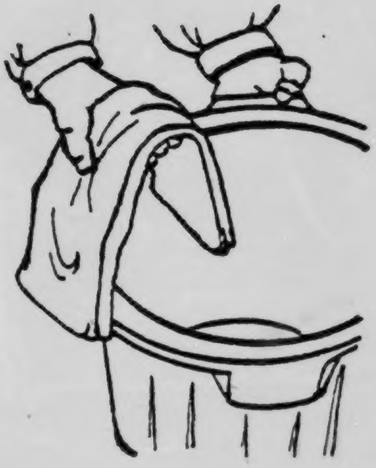
WE WILL KNOW YOU CAN DO IT WHEN:

There is no paper or trash in the building or area you have worked in.

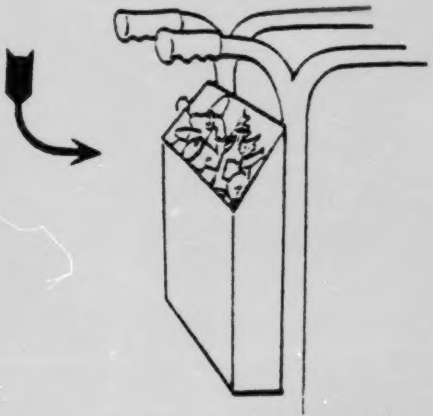
1. Get all the equipment you need.

2. Pick up all trash in the large trash bags. Tie all bags with twine so they do not spill. Put the bags on the 4 wheel push cart.

3. Put a new trash bag liner into each large waste basket.



4. Pick up all noncombustible trash and put it in the trash can on the push cart.



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*******************************************************
*CAUTION:  Do not take push cart into offices, you    *
*          might spill trash.                         *
*          Always wear gloves.                        *
*          Be careful of broken glass.                *
*******************************************************
```

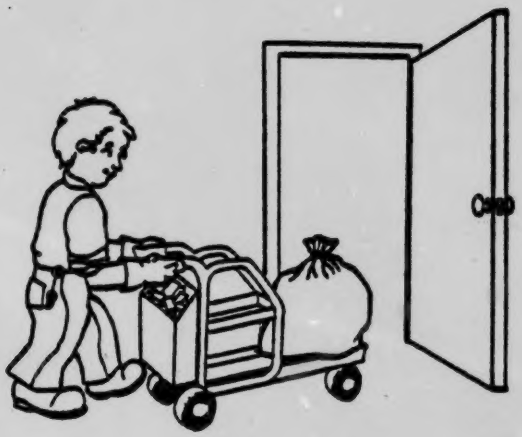
5. Use dust pan brush and dust pan to pick up small trash that falls on the floor. Put this trash in the waste can on the push cart.

6. Check to see if you collected all the trash.

JOB STEPS

7. Repeat Job Steps 2, 3, 4, 5, and 6 for each area or office you are to clean.

8. Take all the trash and the cart to the trash room.



building maintenance & engineering

unit: Maintenance

capital area career center

module: 2201 08 2 **date:** 1-21-77 **level:** 2

skill title: Disposal of paper and trash.

developed & written by: Dwight Smith

visuals by: Dave Wehrwein

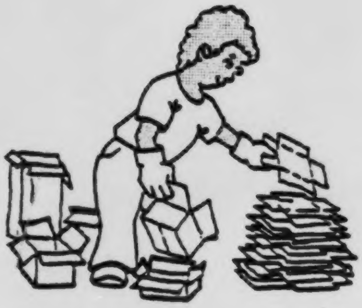
JOB STEPS

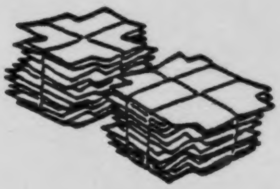
1. Take the bagged trash off the push cart.

> CAUTION: Stack the bags at least 2 feet from lights, pipes and sprinkler heads. It could catch on fire.

2. Put away all unused trash bags.

3. Break down all cardboard boxes. Stack them up in the trash room and tie them together with twine.





4. Empty the noncombustible trash from the container. Be sure to empty it into the bin or barrel used in your building.

5. Use the bench brush to sweep out any trash in the push cart.

6. Clean the dust pan, the dust pan broom and the noncombustible trash container. Put them away in their storage area.

7. Clean off the gloves and put them away.

8. Put away the ball of twine.

JOB STEPS

1. Take the bagged trash off the push cart.

CAUTION: Stack the bags at least 2 feet from lights, pipes and sprinkler heads. It could catch on fire.

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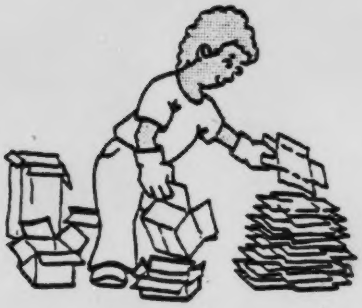

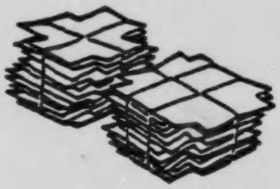

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5. Use the bench brush to sweep out any trash in the push cart.

6. Clean the dust pan, the dust pan broom and the noncombustible trash container. Put them away in their storage area.

7. Clean off the gloves and put them away.

8. Put away the ball of twine.

building maintenance & engineering

unit: Steam Boiler Maintenance & Operation

capital area career center

module: 2201 10 001 date: 1-3-77 level: 1

skill title: Fire Low Pressure Steam Boiler

developed & written by: James F. Smalley

visuals by: Sandra Starnaman

WORD GUIDE

FIRE - To light or ignite a boiler.

LIMIT PRESSURE - Maximum pressure possible.

PERFORMANCE OBJECTIVE

You are going to learn:

How to safely fire a low pressure steam boiler.

And in order to do this you will need:

A steam boiler to work on

We will know you can do this when:

You have completed the steps and the boiler has reached its limit pressure three times.

WORD GUIDE

PSI - A pressure or force. It means pounds per square inch. Your water pressure in your house is about 30 PSI, or 30 pounds per square inch.

INFORMATION	MATERIALS	LOCATION OF MATERIALS
What is a steam boiler? It is a sealed unit where water is heated to make heat or energy. What types of steam boilers are there: There are two basic types: A Low pressure boiler, which is below 15 PSI. A High pressure boiler, which is above 15 PSI. The low pressure is the most common in schools, hospitals and small industry. What fuels are used? COAL - usually in an old style boiler. OIL - usually where natural gas is not available. NATURAL GAS - the most efficient and popular. NUCLEAR - mostly electrical generating plants. Can firing a boiler be dangerous? Yes, you must be thinking at all times. You may have a building with many people in it. You will be responsible for their safety and yours. What safety points must you be thinking about? You must know where the boiler gas supply valve is located. If anything does not seem right, shut it off and get the help of an expert.		

INFORMATION	MATERIALS	LOCATION OF MATERIALS

What could go wrong?

The boiler may not have water in it and it could get very hot and start a fire.

After it reaches its pressure limit, it should stop firing until the steam pressure is too low. If it ever goes above 10 psi., shut off the gas supply and get expert help.

It may be making loud cracking sounds or rocking slightly on the floor. If it does this, shut off the gas supply valve and get expert help.

NOW DO:

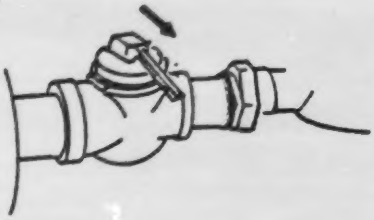
What will you do if the boiler pressure gauge is reading 12 psi.?

a. shut off the gas supply valve
b. wait awhile
c. panic
d. make everyone leave

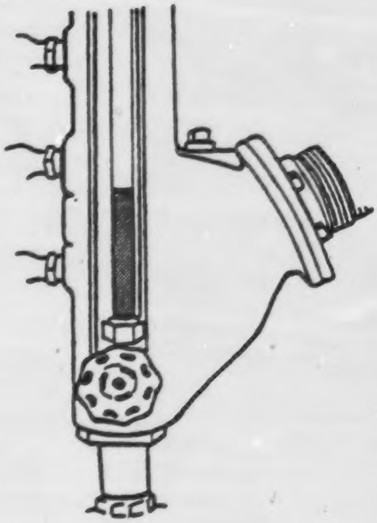
I hope you picked "a". Remember that if anything does not seem right, do not be afraid to ask for assistance.

JOB STEPS

1. Find the gas shut off--it should be along the front of the boiler. STOP--Remember its place. Turn to the off position. The lever on the gas valve should be at a 90° angle to the direction of the gas line.

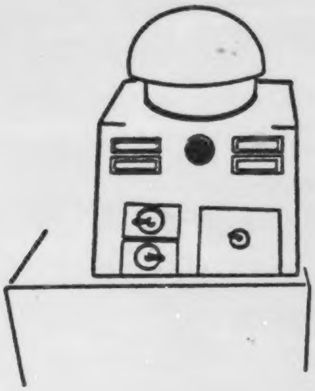


2. Check the water level in the sight glass on the upper part of the boiler. Notice the water level.--It should be about 1/3 the way up the glass.



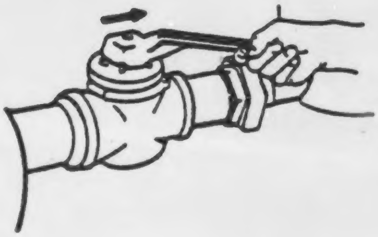
JOB STEPS

3. Turn all switches to the off position. They are located on the boiler control panel in the lower front of the boiler.



4. Turn switch on control panel to "low fire", if your boiler has one.

5. Turn the gas supply valve to the on positon. Notice that when a gas valve is in the "on" position, it runs the same way as the pipe.



6. Turn control switch to the "on" position.

JOB STEPS

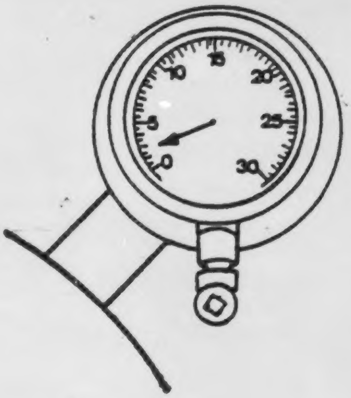
7. Turn the burner or ignition switch to the "on" position. A fan will come on in front of the boiler.

8. Wait 20-30 seconds. The boiler should now be fired. If flame failure light or low water light is on, turn burner switch off, shut main gas valve and go for expert help.

9. Watch boiler for 15 minutes.

10. Turn the "low fire" switch to "high fire", if boiler has one.

11. Look at the steam pressure gauge on the top or front of the boiler. Remember the reading. It will probably be a low reading.

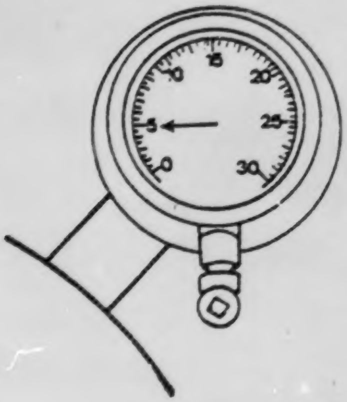


12. Check the sight glass. It should be in about the place it was when we started, 1/3 up on the glass.

13. Wait 30 minutes. Do things seem to be working properly?

JOB STEPS

14. Check steam pressure gauge. It should be moving up.

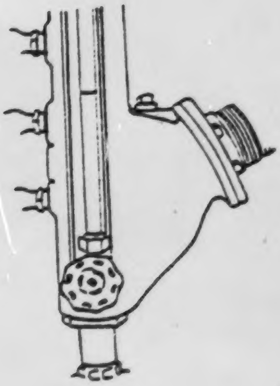


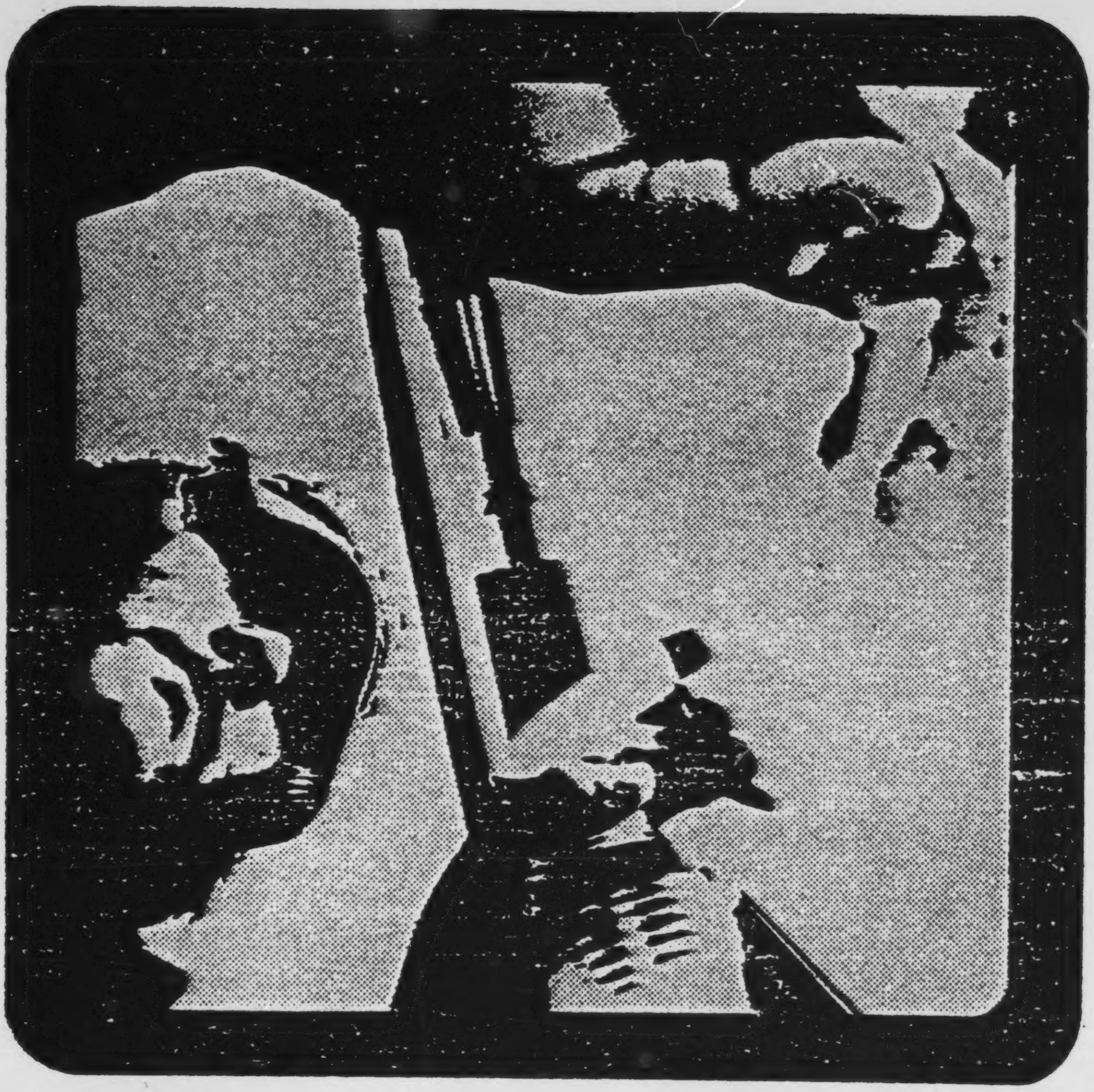
15. Wait until the boiler shuts off. This should be between 3 and 7PSI.

16. After it shuts off, wait for it to come on. It should come on when the steam pressure drops.

17. Continue this "on -- off" cycle 2 more times.

18. Check the water level on the sight glass and the pressure gauge in 3 more hours.





building maintenance & engineering

unit: Steam Boiler Maintenance and Operation

capital area career center

module: 2201 10 002 date: 1-4-77 level: 1

skill title: Determine Water Level in a Steam Boiler

developed & written by: James F. Smalley

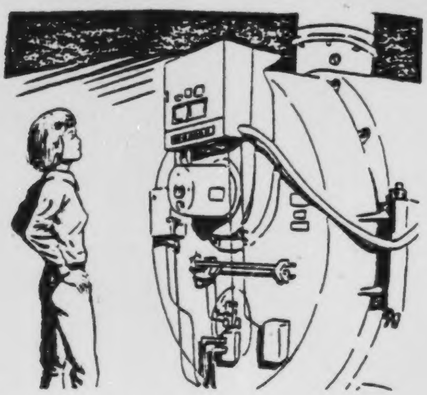
visuals by: Sandra Starnaman

PERFORMANCE OBJECTIVE

YOU ARE GOING TO LEARN:

How to find the water level of a steam boiler by using a glass sight gauge.

AND IN ORDER TO DO THIS YOU WILL NEED:



Steam boiler

WE WILL KNOW YOU CAN DO IT WHEN:

You can read the glass sight gauge.

WORD GUIDE

SEALED - not open to the air vapor.

EVAPORATION - water that mixes with the air.

RADIATOR - the heaters that supply heat to each room.

AUTOMATIC WATER FEED - adds water to a boiler by itself as the water drops

INFORMATION	MATERIALS	LOCATION OF MATERIALS
Why do we need to know what the water level of a boiler is? To keep it running well. If the water is too low, the boiler will stop. This could be at night and the building could become cold. How would a boiler lose water if it is a sealed unit? It is sealed, but we can lose water through evaporation and leaks in radiators and pipes. If the water is low, how is more water put back into the boiler? Through the use of the automatic water feed next to the glass gauge. NOTE: It is bad to keep adding fresh water into a boiler. It adds too many minerals. If you notice that your automatic water feed is running often, find out where the boiler water is leaking.		

INFORMATION	MATERIALS	LOCATION OF MATERIALS

Should the water level vary?

Only a little - It may drop 1 inch when the boiler just starts, or raise slightly when the boiler is not running.

It will usually be along the same line as marked on the automatic water feed.

When should we check the water level?

It should be one of your daily checks and you would be smart to check it everytime you walk past the boiler.

NOW DO:

What happens if the water level drops too low?

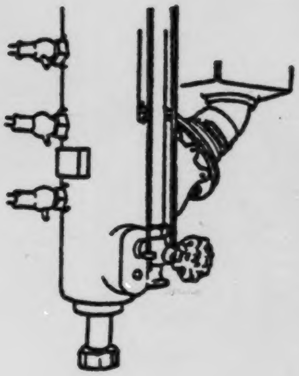
a. boiler stops
b. boiler runs faster
c. just the fan runs
d. fresh water turns salty

"a" is the correct answer.

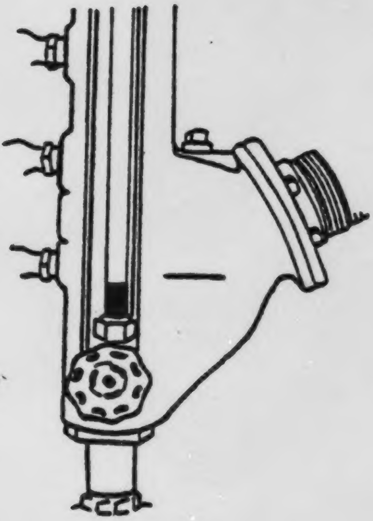
REMEMBER - If the automatic water feed quit working and the water level dropped to a low level, the boiler would stop. This is a safety device to prevent overheating.

JOB STEPS

1. Find the glass sight gauge and the automatic water feed on the upper front of boiler.

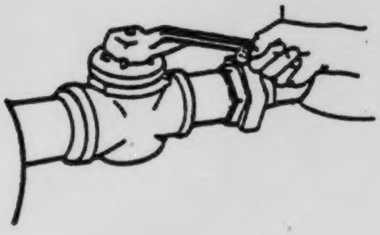


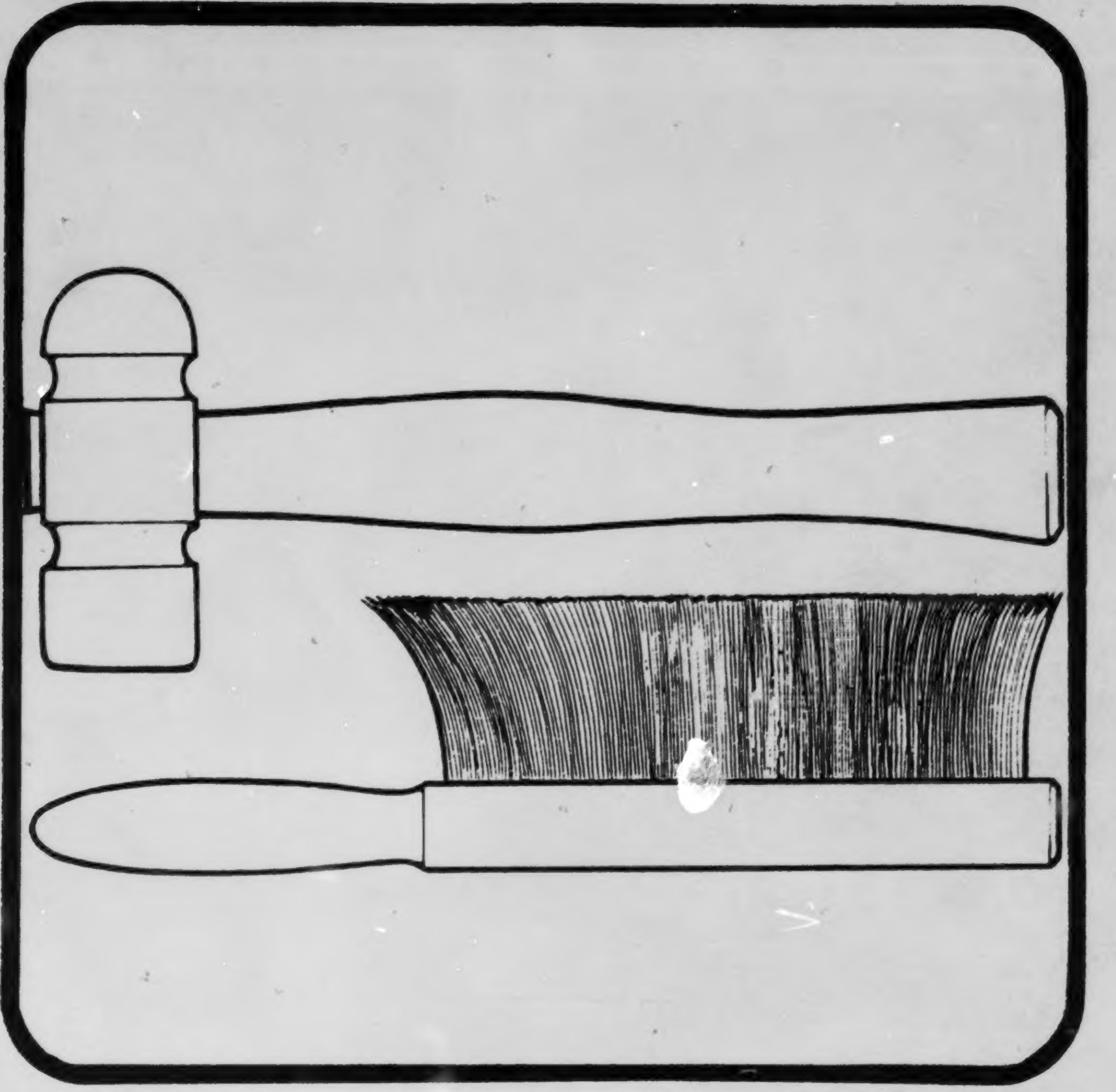
2. Look at the line on the automatic water feed and line it up to the glass sight gauge.



JOB STEPS

3. If water level is too low, and boiler is running, the boiler may overheat. Turn off the gas and get expert help.





building maintenance & engineering

unit: BOILER MAINTENANCE AND OPERATION

capital area career center

module: 2201 10 003 date: January 1977 level: 1

skill title: Blow Down a Steam Boiler

developed & written by: James F. Smalley

visuals by: Sandra Starnaman

WORD GUIDE

SLUDGE - mineral deposits found in water that mix to form a mud.

SCALE - sludge that has turned very hard.

PERFORMANCE OBJECTIVE

You Are Going To Learn:

How to blow down a steam boiler in order to remove sludge and scale in the water.

And In Order To Do This You Will Need:

Boiler

We Will Know You Can Do It When:

The water in the bottom of the boiler is free of sludge and scale and the water level is at the right level.

INFORMATION	MATERIALS	LOCATION OF MATERIALS

Why do you blow down a boiler?

Because after a period of time minerals build up on the inside of the boiler. If we did not drain this sludge and scale, it would harden.

What would happen if we let these minerals harden?

The boiler would take longer to heat up. This costs extra money because it takes more fuel to heat it up.

How often should we blow down a boiler?

Usually about once a week, if needed.

Why should we blow down a boiler in the morning?

Because the boiler does not run as much at night and the sludge and scale drop to the bottom of the boiler.

Is there anything dangerous about blowing down a boiler?

If we drain too much water out the boiler will shut off. If the boiler kept running there could be an explosion from overheating.

What about my safety?

The water that you are draining from the bottom of the boiler is about 225 degrees. This is hotter than boiling water. Be careful.

NOW DO:

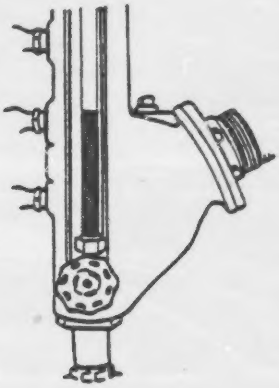
How often should we blow down a boiler?

a. once a month, if needed.
b. once a week, if needed.
c. once a day.
d. never, as long as it runs.

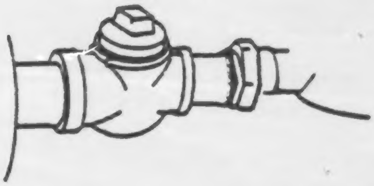
Hope you picked "b" - we do not want a build up of sludge and scale.

JOB STEPS

1. Check water level in sight glass on the upper part of the boiler. Remember where it is.



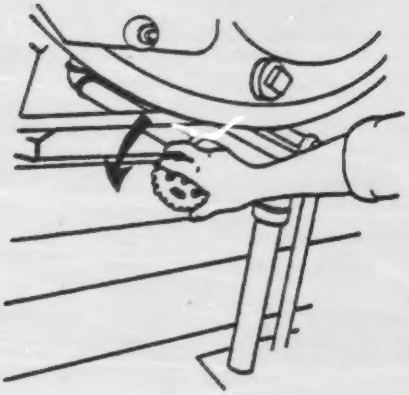
2. Locate the blow down valves on the bottom of the boiler. They may be anywhere, front, rear or sides. They will be on the lower part of the boiler.



WORD GUIDE

BOILER COMPOUND - added to boiler at the beginning of a season. Keeps down the mineral build-up.

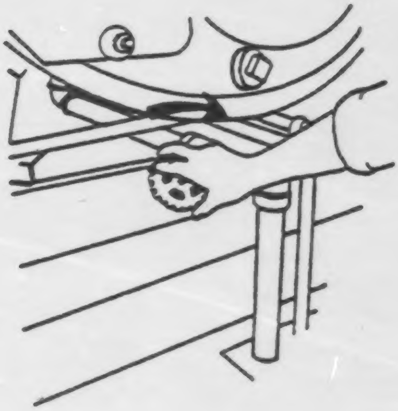
3. Turn the valve counter-clockwise to open. Open valve about halfway.



4. Leave the valve open until water clears up.

NOTE: This will not be more than a few minutes. The water may be yellow or green from the boiler compound. The sludge and scale is usually a clay color.

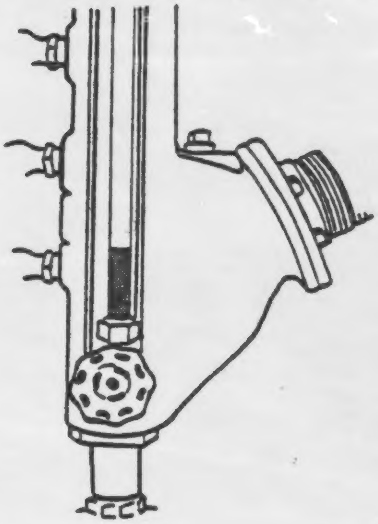
5. Turn the valve clockwise to close.



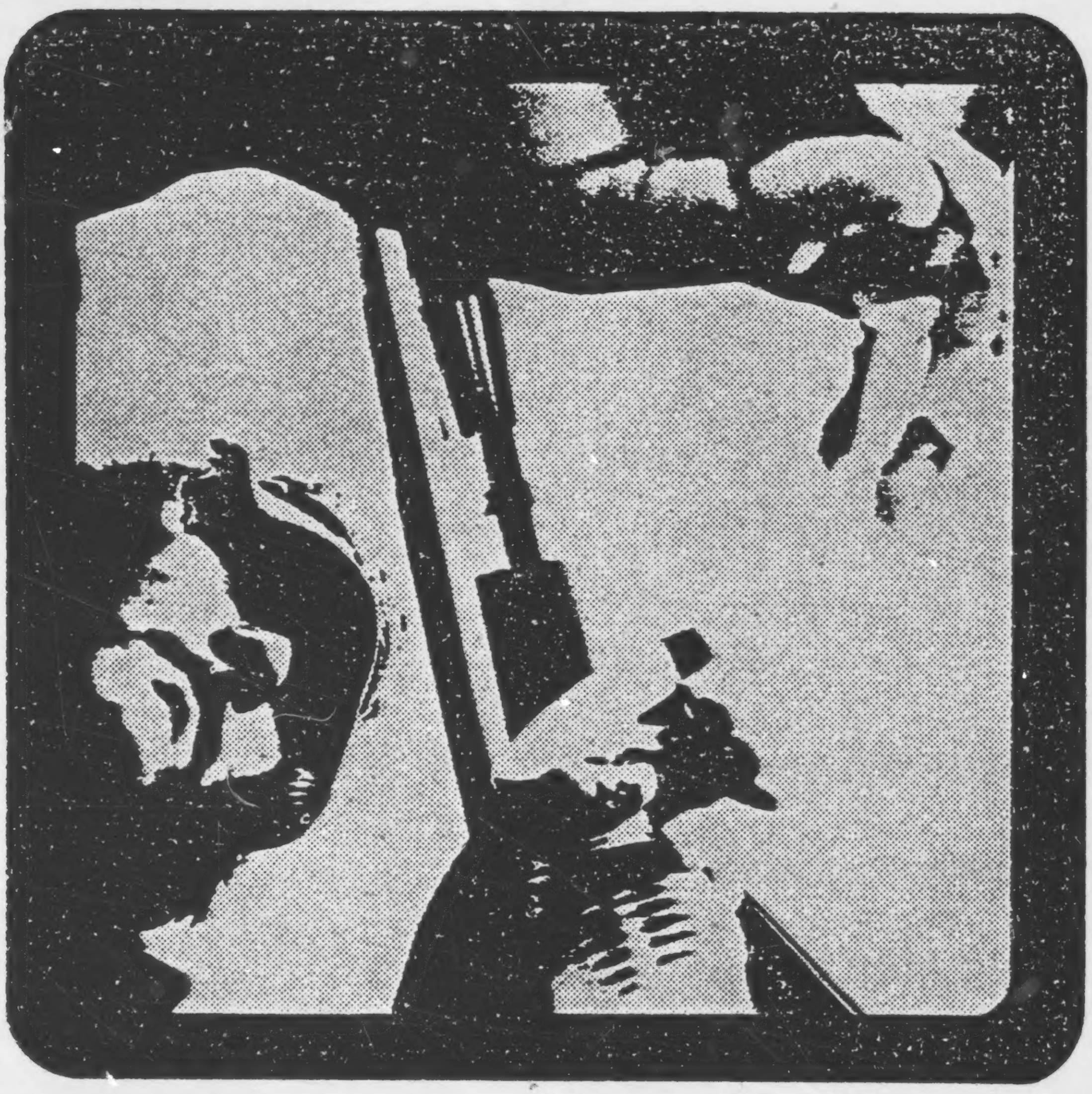
WORD GUIDE

AUTOMATIC WATER FEED - replaces water lost in a boiler or heating system automatically.

6. Notice that the water in the sight glass has dropped.



7. Wait 15 minutes. The "Automatic Water Feed" will add water.
8. Notice that the sight glass is close to its original position.
9. The boiler should be running.



building maintenance & engineering

unit: POWER TOOLS

capital area career center

module: 2201 20 001 date: 2/77 level:

skill title: Operation of Sabre Saw

developed & written by: Mike Polen

visuals by: Bill Draper

PERFORMANCE OBJECTIVE

You Are Going To Learn:

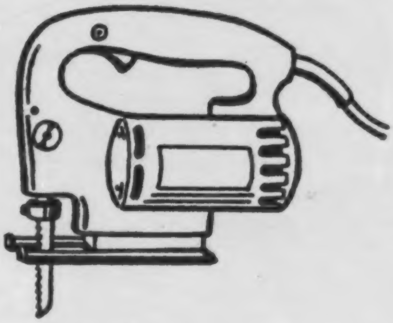
How to use a sabre saw

And In Order To Do This You Will Need:

Tri-square

Piece of Plywood

Pencil



Sabre Saw

We Will Know You Can Do It When:

Following safety instructions, you have cut the plywood along the curved lines and the straight corners.

WORD GUIDE

OBSTRUCTION - Something under the plywood; such as the table or bench.

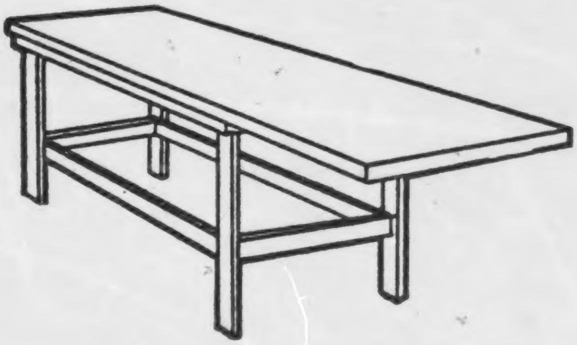
CAUTION!

A. Never remove the saw from a cut until blade has stopped moving.

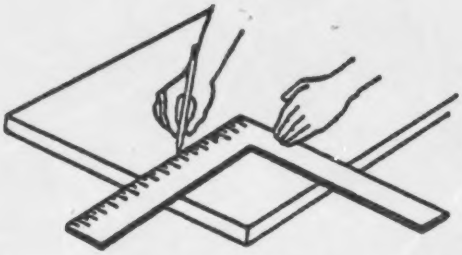
B. Remove electrical plug from socket when making adjustments or changing blades.

JOB STEPS

1. Place plywood on table so that your cutting area is free from any obstruction.

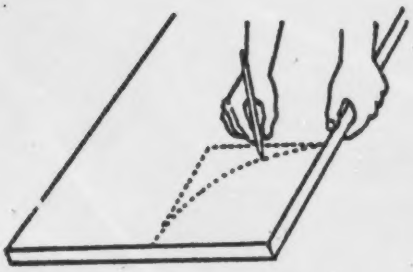


2. With a pencil and Tri-square (T-square) draw a square corner on plywood.

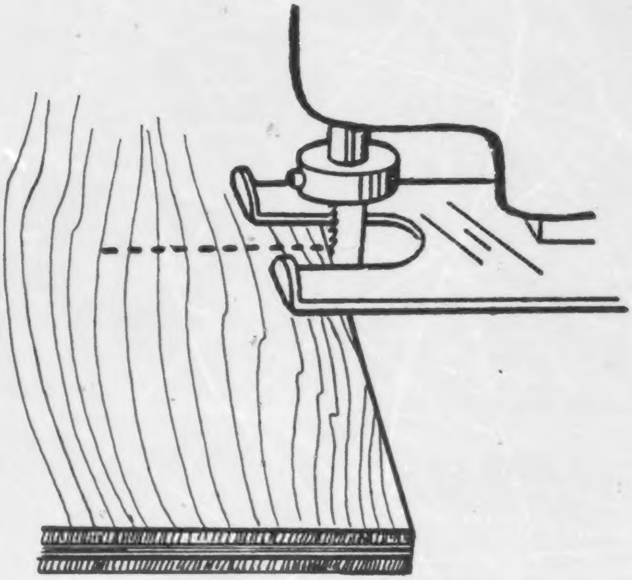


JOB STEPS

3. Then draw a curved line between the two ends of your square corner.

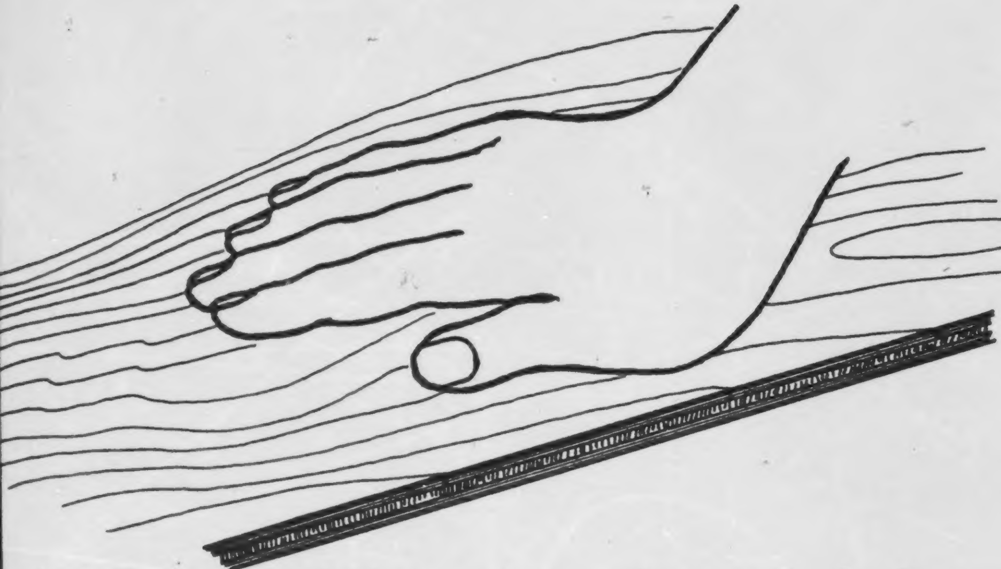


4. Place front of saw-stand flat on the plywood. Line up blade with the pencil line through the viewing gap.

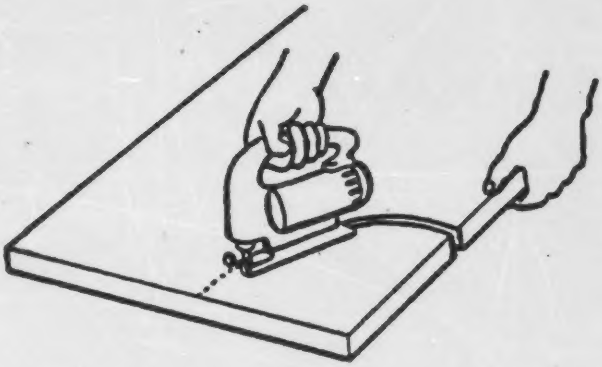


JOB STEPS

5. Put one hand or a heavy weight on the plywood to hold it steady.



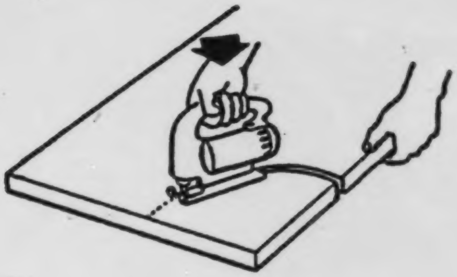
6. Turn saw switch on and move the saw slowly forward, keeping blade on curved pencil line.



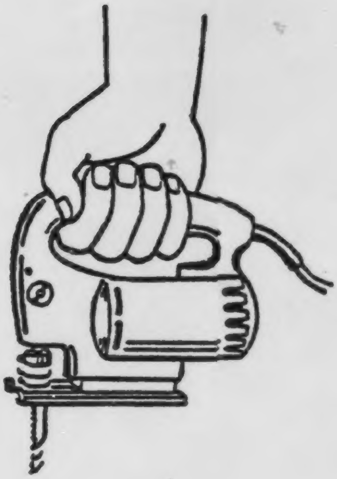
DOWN PRESSURE - Press down on saw.

JOB STEPS

7. Keep down pressure on the saw so it won't jump up and down on material.

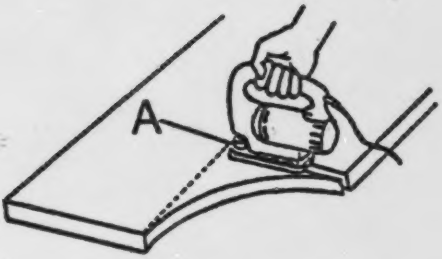


8. When complete cut is made do not lay saw down until it has stopped moving.

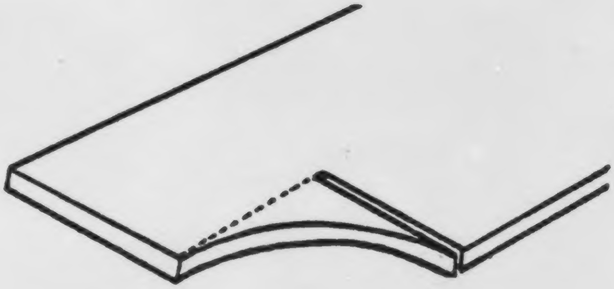


JOB STEPS

9. See diagram for cutting square corners. Cut along line until you reach angle of square (Point A).



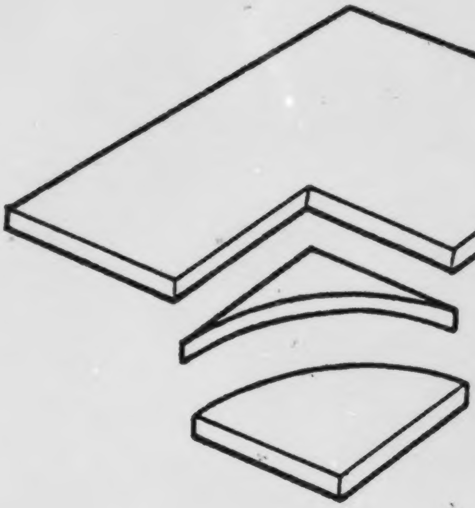
10. Stop the saw. When saw is stopped, pull saw out and cut along other line until you reach angle of square.

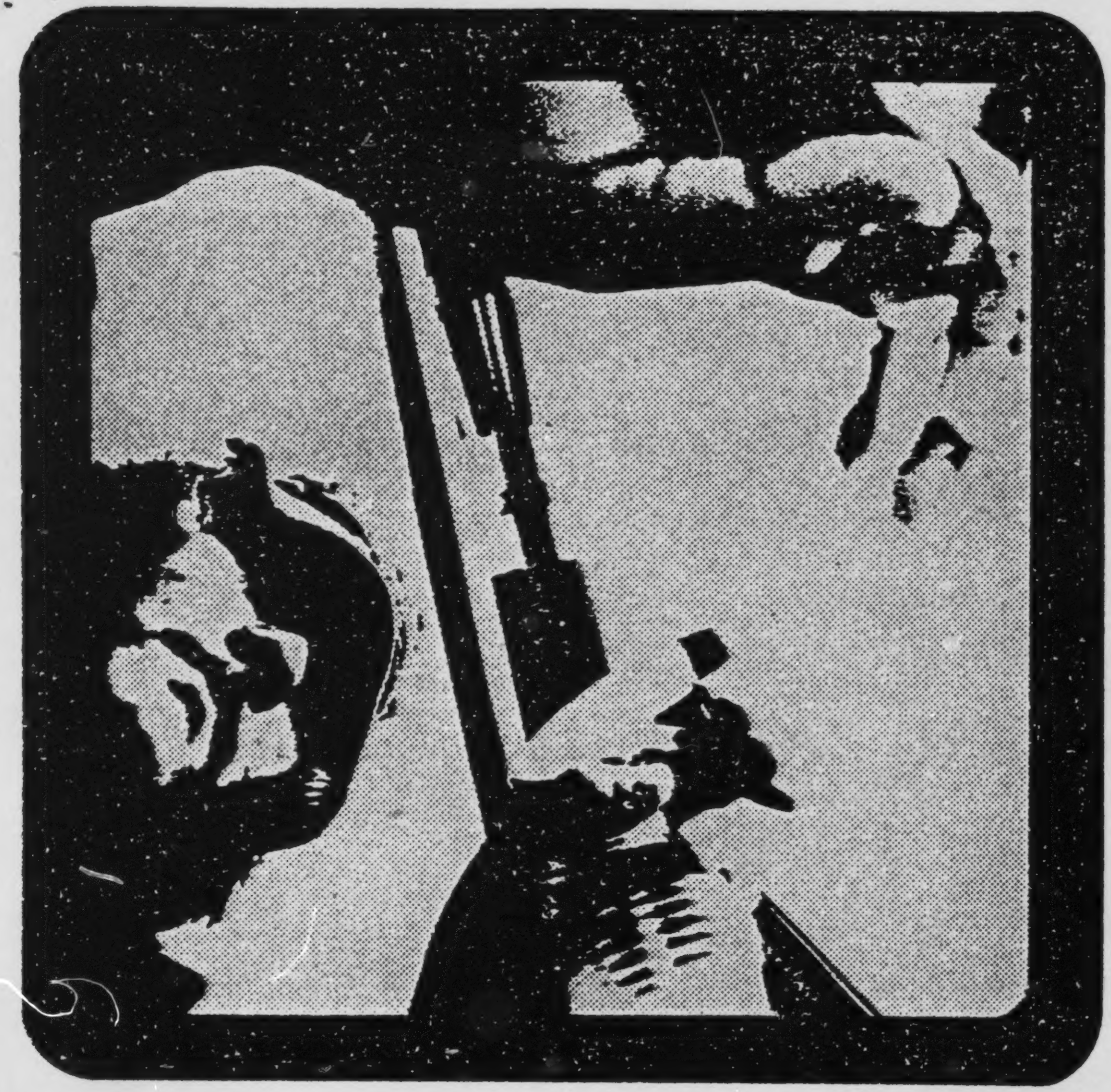


JOB STEPS

11. Unplug your saw.

12. Your plywood pieces should look like the figures below. Take all three pieces to your instructor.





building maintenance & engineering

unit: Power Tools

capital area career center

module: 2201 20 2 date: 2/77 level: II

skill title: Operation of Drill Press

developed & written by: Mike Polen

visuals by: Chuck Knock and Marie Gougeon

PERFORMANCE OBJECTIVE

You Are Going To Learn:

How to use a drill press.

And In Order To Do This You Will Need:

drill press

drill bit

hammer

prick punch

piece of scrap material

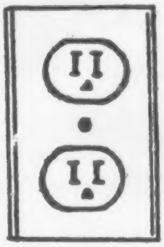
We Will Know You Can Do It When:

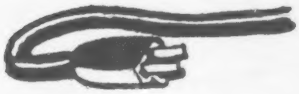
The hole you have drilled is in the right place, is straight, and you worked safely.

JOB STEPS

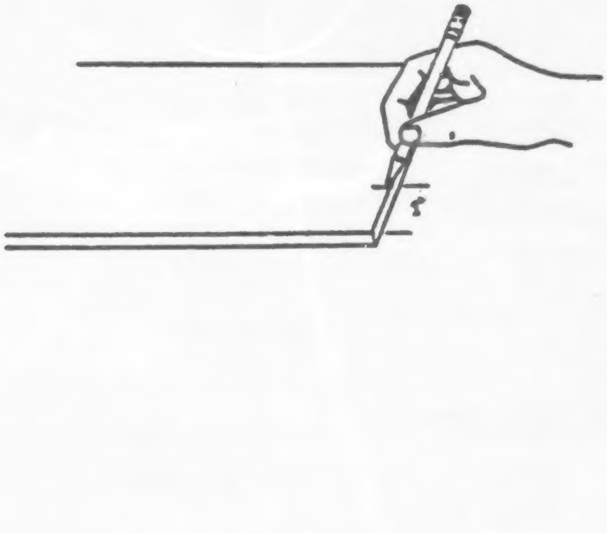
CAUTION:

1. Unplug electrical cord when changing bits.
2. Do not leave the chuck wrench in the drill chuck when you are done using it.





1. On the piece of material, measure up 1 inch from the bottom right corner and make a pencil mark.



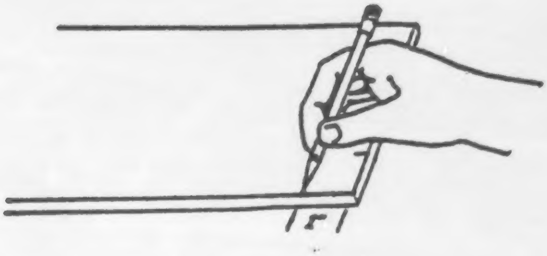
WORD GUIDE

TRI-SQUARE - Used to measure and make angles.

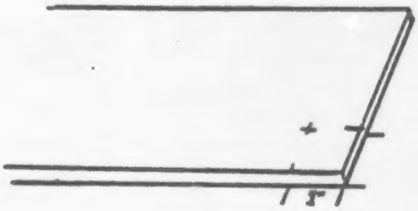
PRICK PUNCH - Metal tool with pointed end.

JOB STEPS

2. Measure 1 inch to the left of bottom right corner and make pencil mark.



3. Place a tri-square even with each mark and put a mark at the 1 inch point.

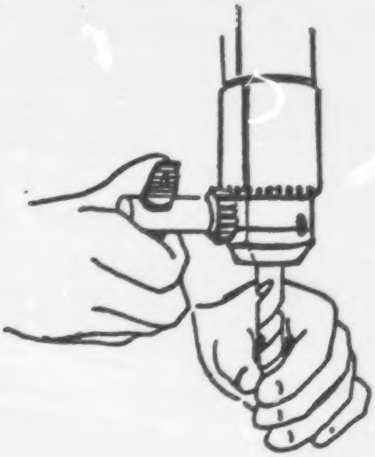


4. Place the point of the prick punch in the center of the crossing marks and tap firmly with a hammer to make a nick in the material.

JOB STEPS

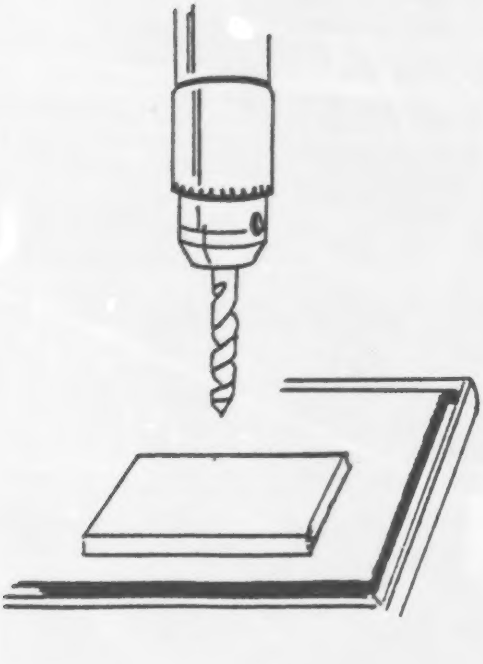
5. Unplug electrical cord.

6. Place a 1/4 inch drill bit in the chuck using chuck wrench to tighten bit.



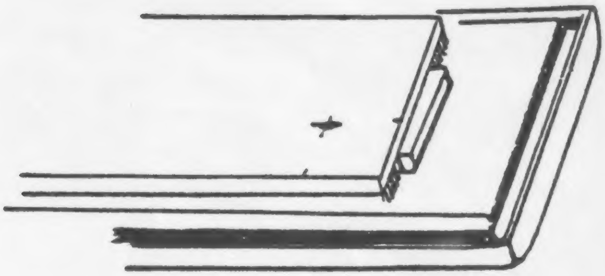
7. Remove wrench and lay it in tray.

8. Place a small piece of wood on the drill table directly below the drill bit.



JOB STEPS

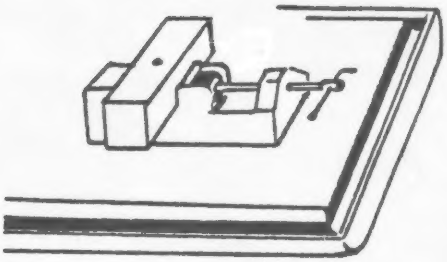
9. Place material with the punch hole on top of the piece of wood.



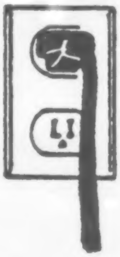
10. Move drill press control lever down toward material to be drilled and move the piece so drill bit will hit the punched mark.

11. When lined up hold material in place and release control lever.

    NOTE: SOMETIMES THE MATERIAL CAN BE HELD DOWN WITH A CLAMP.



12. Plug in electrical cord.



JOB STEPS

13. Press the start button and lower control lever.

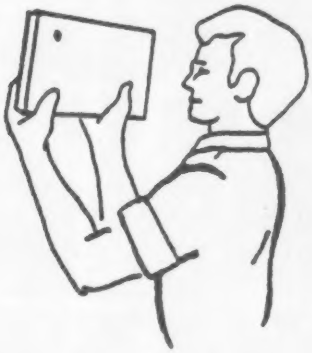
14. As bit and material meet, lower control lever slowly and drill through the material.

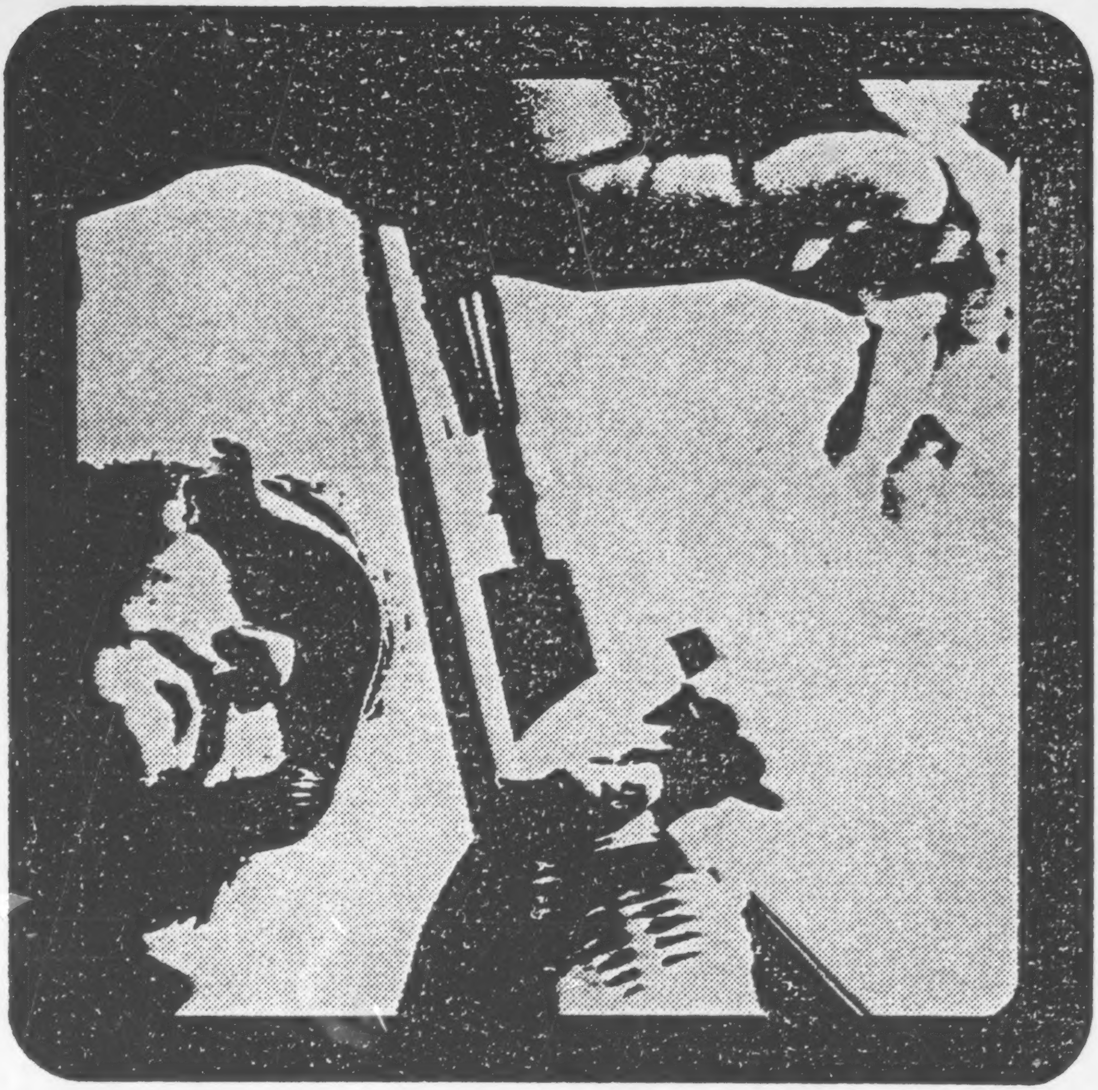
    NOTE: KEEP A TIGHT HOLD ON THE MATERIAL BECAUSE AS THE BIT COMES THROUGH, IT WILL TRY TO TURN WITH THE DIRECTION ON THE DRILL.

15. When the hole is drilled, slowly raise the control lever.

16. Push stop button.

17. Take drilled material to your instructor. The center of the hole should be as shown below.





building maintenance & engineering

unit: Power Tools

capital area career center

module: 2201 20 003 **date:** 2/77 **level:** I

skill title: Operation of Power Sander

developed & written by: Mike Polen

visuals by: Chuck Knock and Marie Gougeon

PERFORMANCE OBJECTIVE

You Are Going To Learn:

How to use a power sander.

And In Order To Do This You Will Need:

power sander

sandpaper

piece of wood material

We Will Know You Can Do It When:

The wood you have sanded is smooth to the touch, without scratches and rough spots, and dust has been removed.

JOB STEPS

CAUTION:

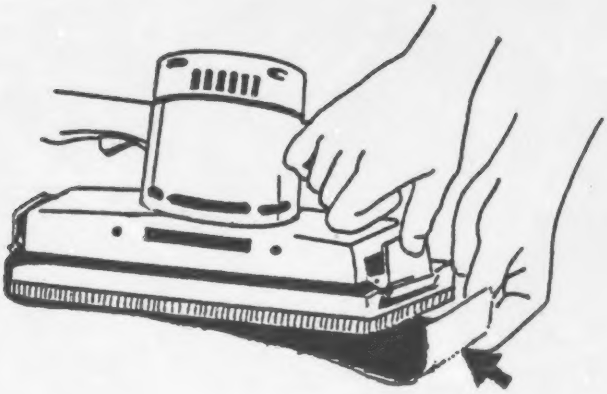
1. Remove electrical plug when changing sandpaper.

2. Keep a firm grip on sander to avoid making digs or mars on wood and to avoid dropping the sander.

JOB STEPS

1. With sander unplugged, lift spring clamps. Slide at least 1/2 inch of sand paper under the holding edge. Push clamps down.

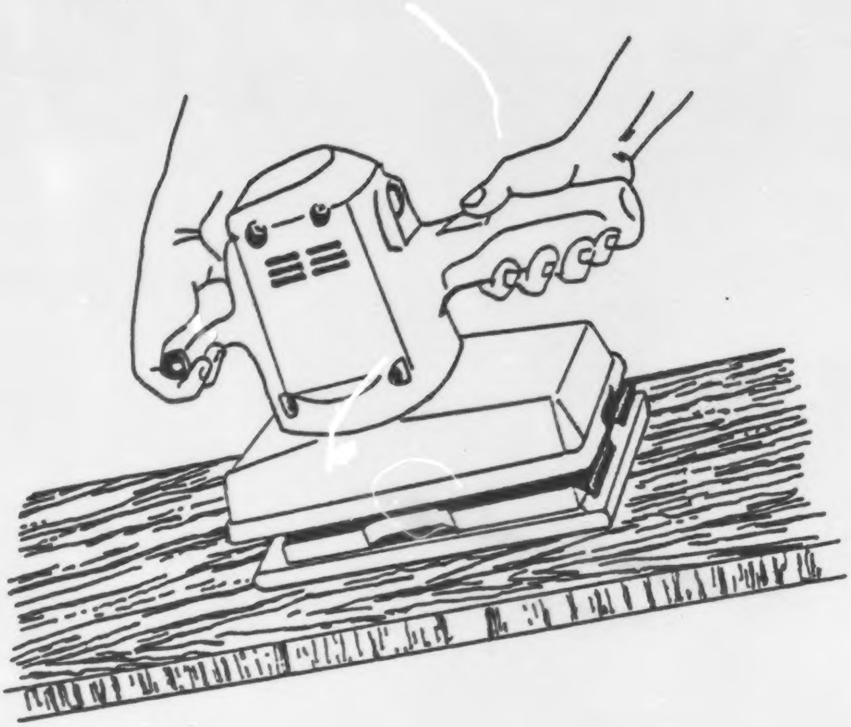
2. Be sure sand paper is held firmly, with no droop.



JOB STEPS

3. Plug in sander.

4. Place sander on wood so that it will follow the grain.



WORD GUIDE

OVERLAPPING - Keeping one inch of sandpaper on sanded part when sanding another part.

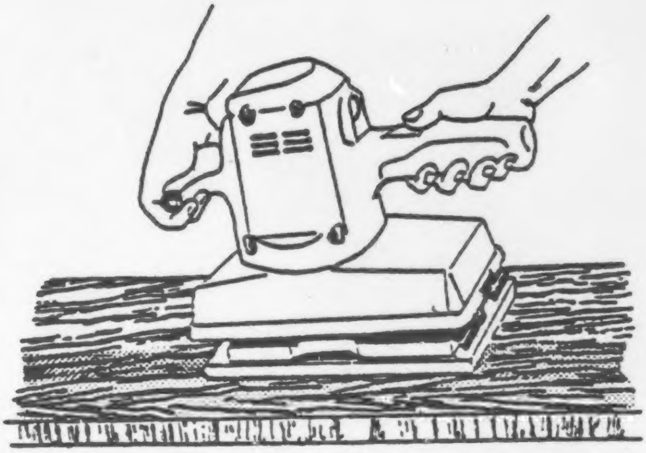
JOB STEPS

5. Take a firm grip on the sander with both hands. Apply slight downward pressure.

6. Turn on the switch and move sander slowly back and forth with the grain of the wood.

CAUTION: Do not tilt the sander. This will make deep digs in the wood.

7. Move to the left or right overlapping each stroke until entire surface is sanded.



WORD GUIDE

GRIT - Surface of sandpaper

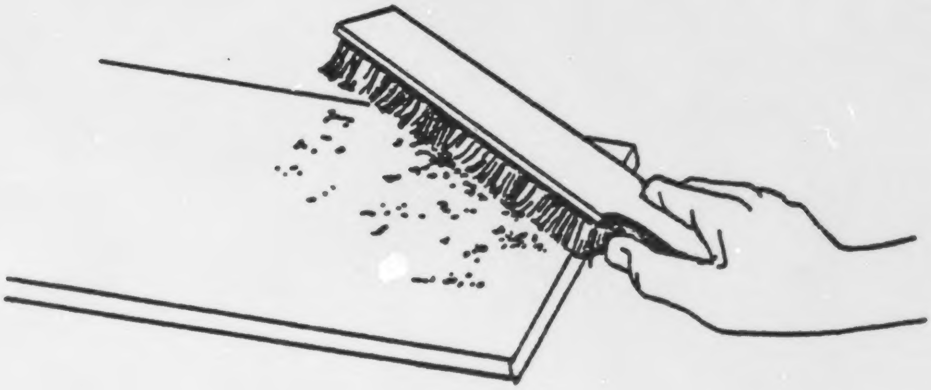
JOB STEPS

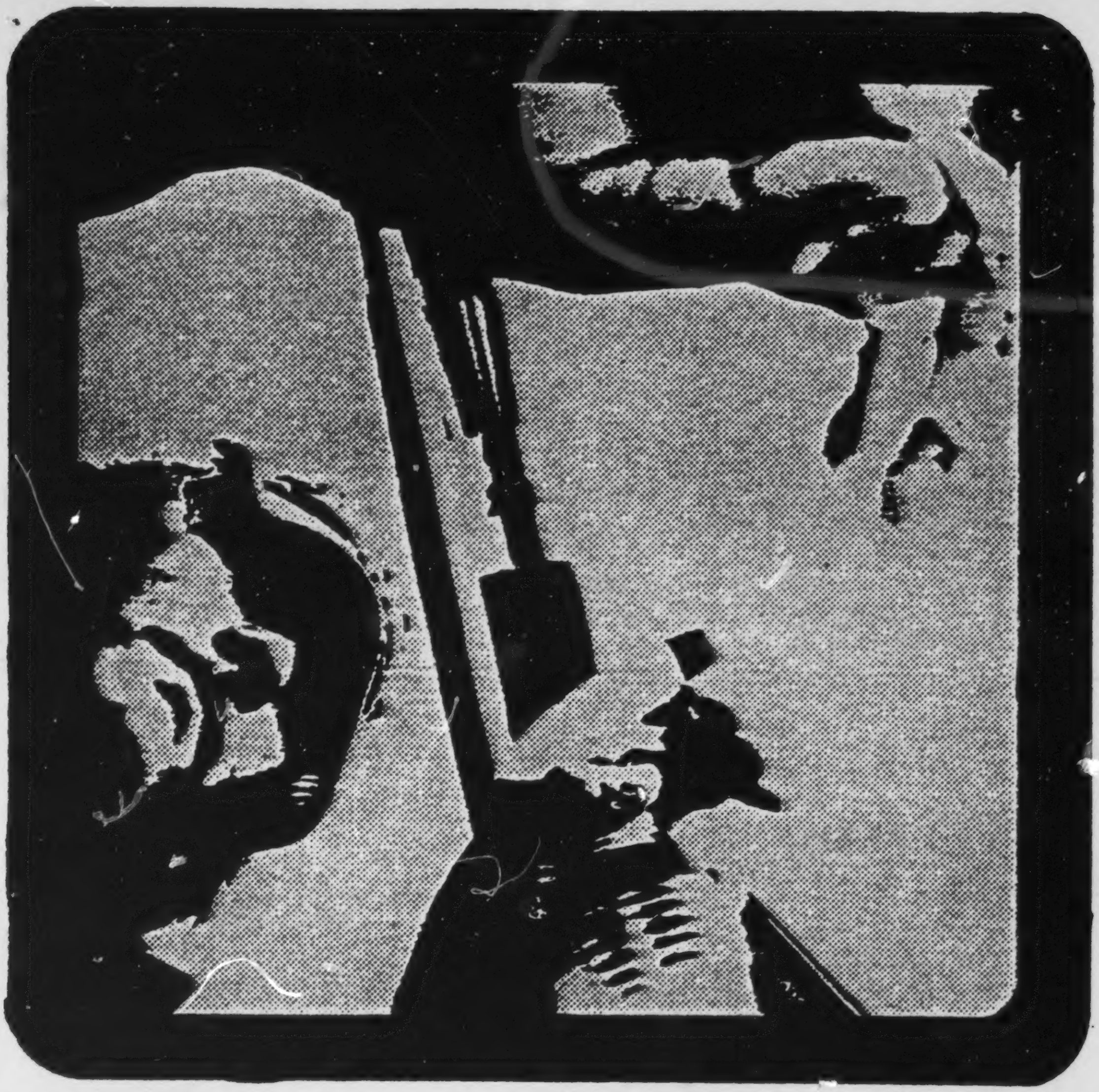
8. Brush off the dust from the surface and rub your fingers over the area. You will be able to feel any rough spots.

9. Do steps 4, 5 and 6 until surface is smooth.

NOTE: ON VERY ROUGH MATERIAL USE A COARSE GRIT PAPER FIRST, THEN CHANGE TO A MEDUIM GRIT, AND LAST A FINE GRIT FOR A SMOOTH FINISH.

10. When you think the wood is smooth, brush off dust and show it to your instructor.





building maintenance & engineering

unit: Power Tools

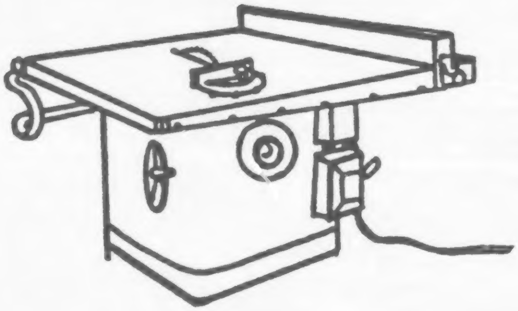
capital area career center

module: 2201 20 004 date: 2/77 level: I

skill title: Operation of Table Saw

developed & written by: Mike Polen

visuals by: Chuck Knock



WORD GUIDE

CUT - Saw across the wood grain, or using angle guide.

RIP - Saw with the wood grain, or using rip fence.

PERFORMANCE OBJECTIVE

You Are Going To Learn:

How to use a table saw.

And In Order To Do This You Will Need:

table saw

piece of wood material

ruler

We Will Know You Can Do It When:

1. You are able to cut a board that measures within 1/16 of an inch of the width you were told to cut.
2. You are able to rip a board that also is right within 1/16 of an inch.
3. You have done the above in a safe manner.

WORD GUIDE

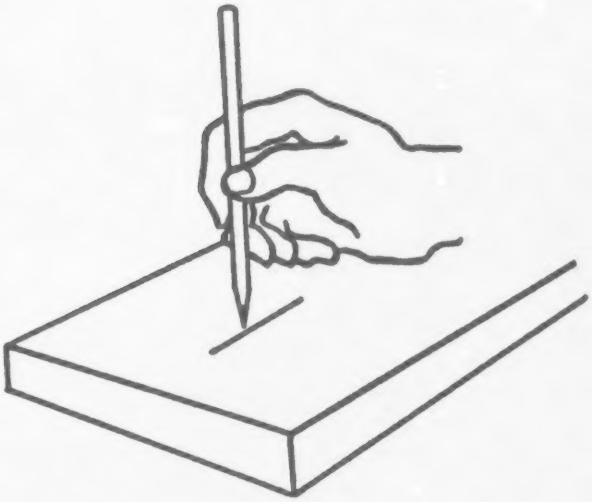
SAW GUARD - Thing over the blade that keeps your hand away.

JOB STEPS

CAUTION:

1. Do not operate the saw without a guard over the blade.
2. Never place your hand or fingers inside the guarded area.
3. Remove electrical plug when changing blades.
4. Always keep the blade sharp.

1. Measure 2 inches and draw a line on the front edge of the material.

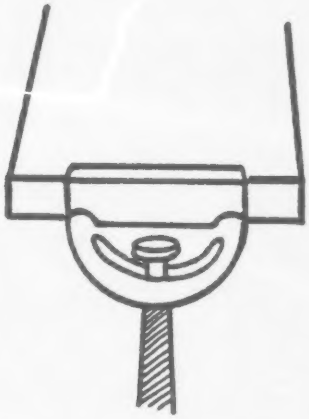


WORD GUIDE

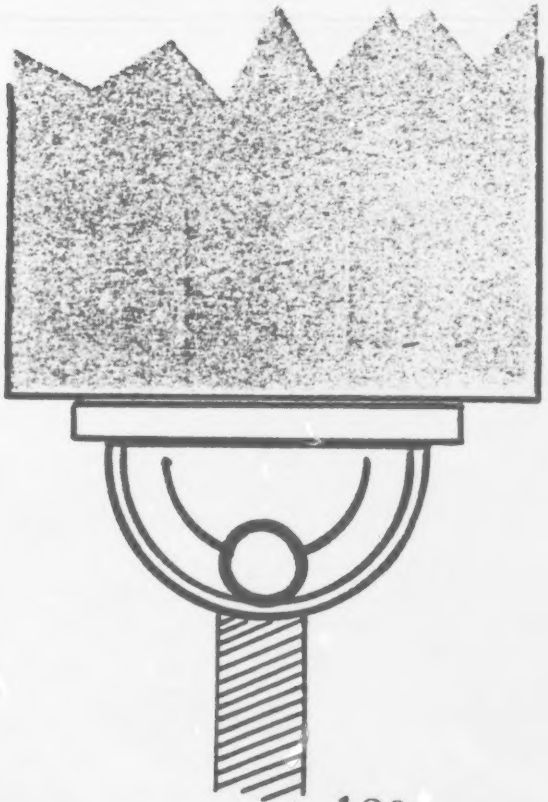
ANGLE GUIDE - The tool that slides in the groove on the table.

JOB STEPS

2. Place material in front of the angle guide.

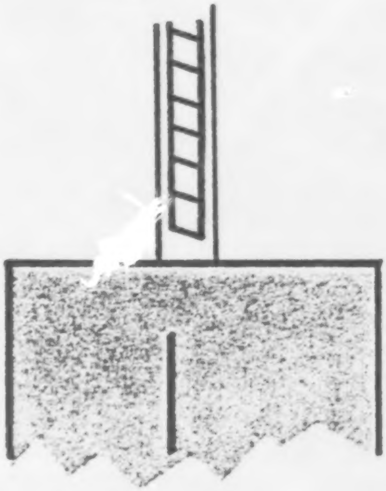


3. Push angle guide tight to the back edge of the material.



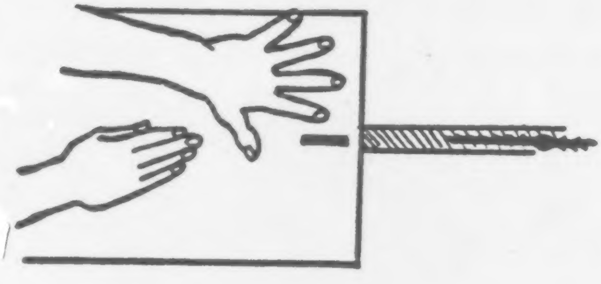
JOB STEPS

4. With one hand on the material and the other hand on the guide, line up the saw blade with the 2 inch line on the material.



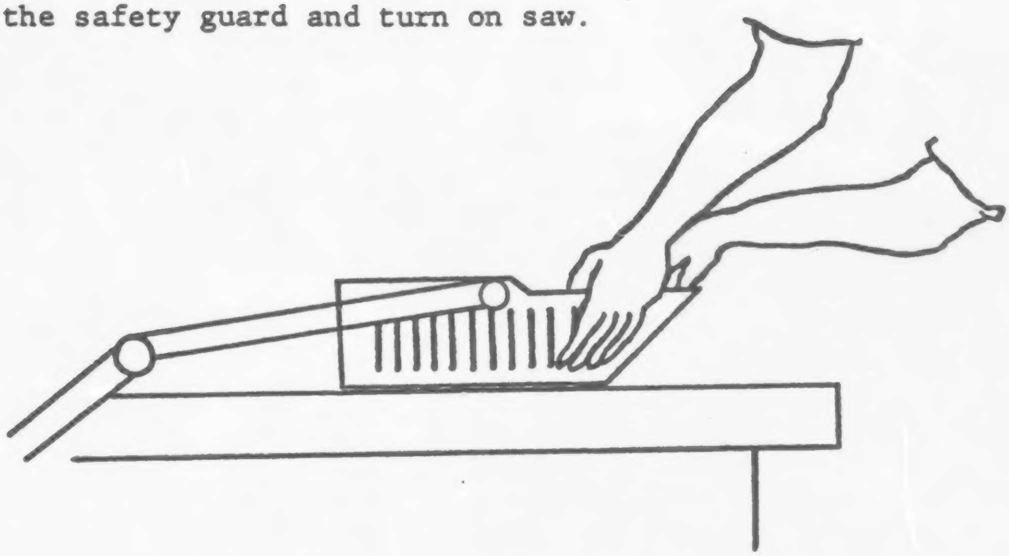
NOTE: CUTTING EDGE OF THE BLADE SHOULD BE PLACED SO THAT THE LINE WILL NOT BE CUT OFF.

5. Back material away from saw blade keeping material in exact position as in job step 4.

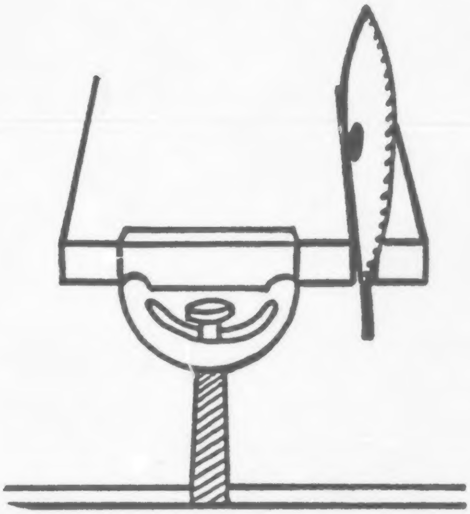


JOB STEPS

6. Lower the safety guard and turn on saw.



7. Slowly push the material through the blade using the angle guide.



NOTE: USE OTHER HAND TO STEADY THE MATERIAL, BUT KEEP IT AWAY FROM THE BLADE.

8. Turn the saw off and wait until blade stops moving before picking up sawed off material.

WORD GUIDE

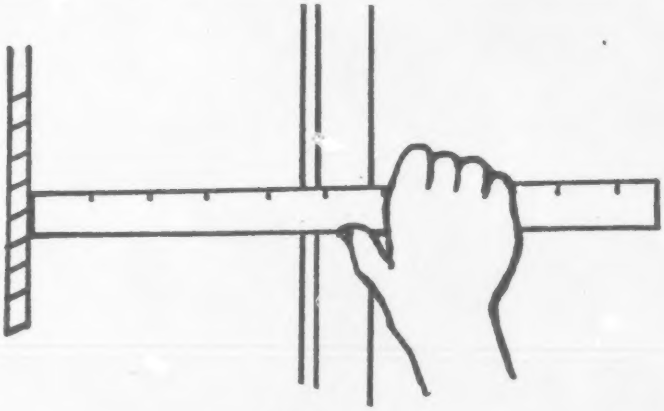
RIP FENCE - The piece of metal that adjusts sideways on the table.

JOB STEPS

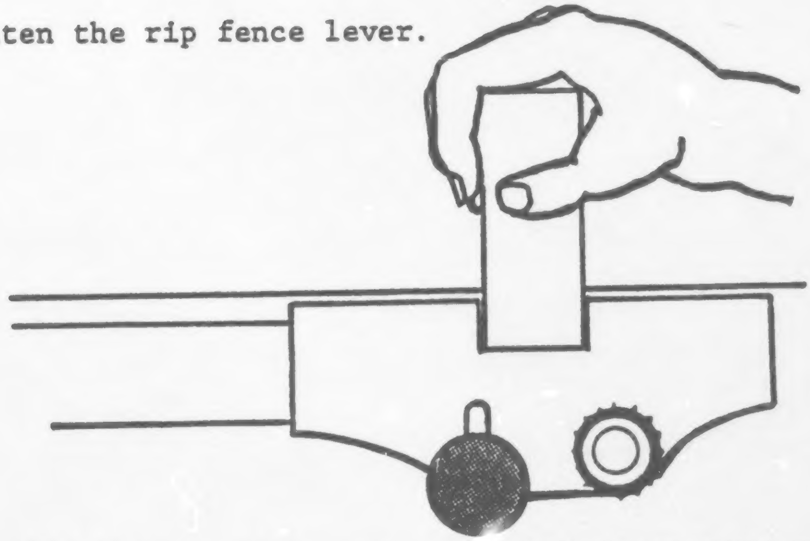
9. Measure the material for accuracy.

USE OF RIP FENCE

10. Measure 4 inches from inside edge of saw blade to rip fence.



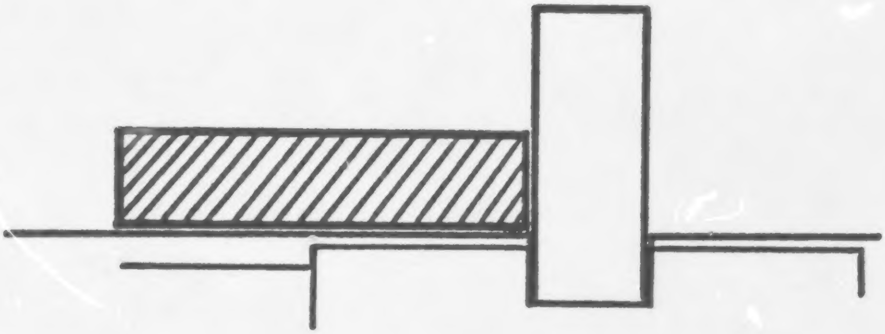
11. Tighten the rip fence lever.



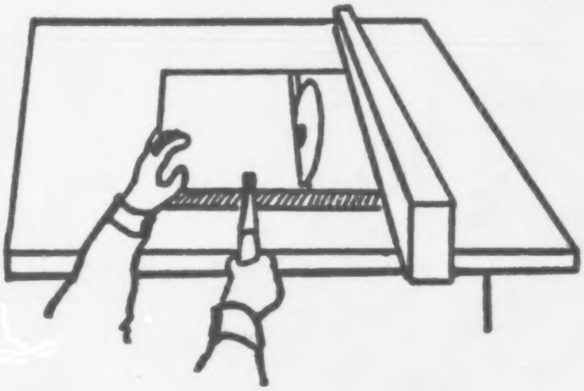
NOTE: WATCH CLOSELY TO BE SURE THAT RIP FENCE DOES NOT MOVE WHEN TIGHTENED.

JOB STEPS

12. Place material tight against rip fence. Lower the safety guard.



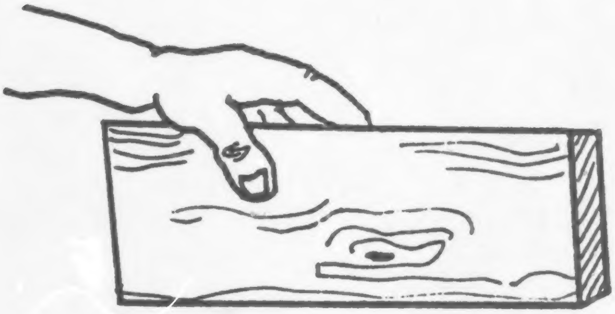
13. Turn on the saw switch. Using a small piece of wood, push the material slowly through the saw blade.

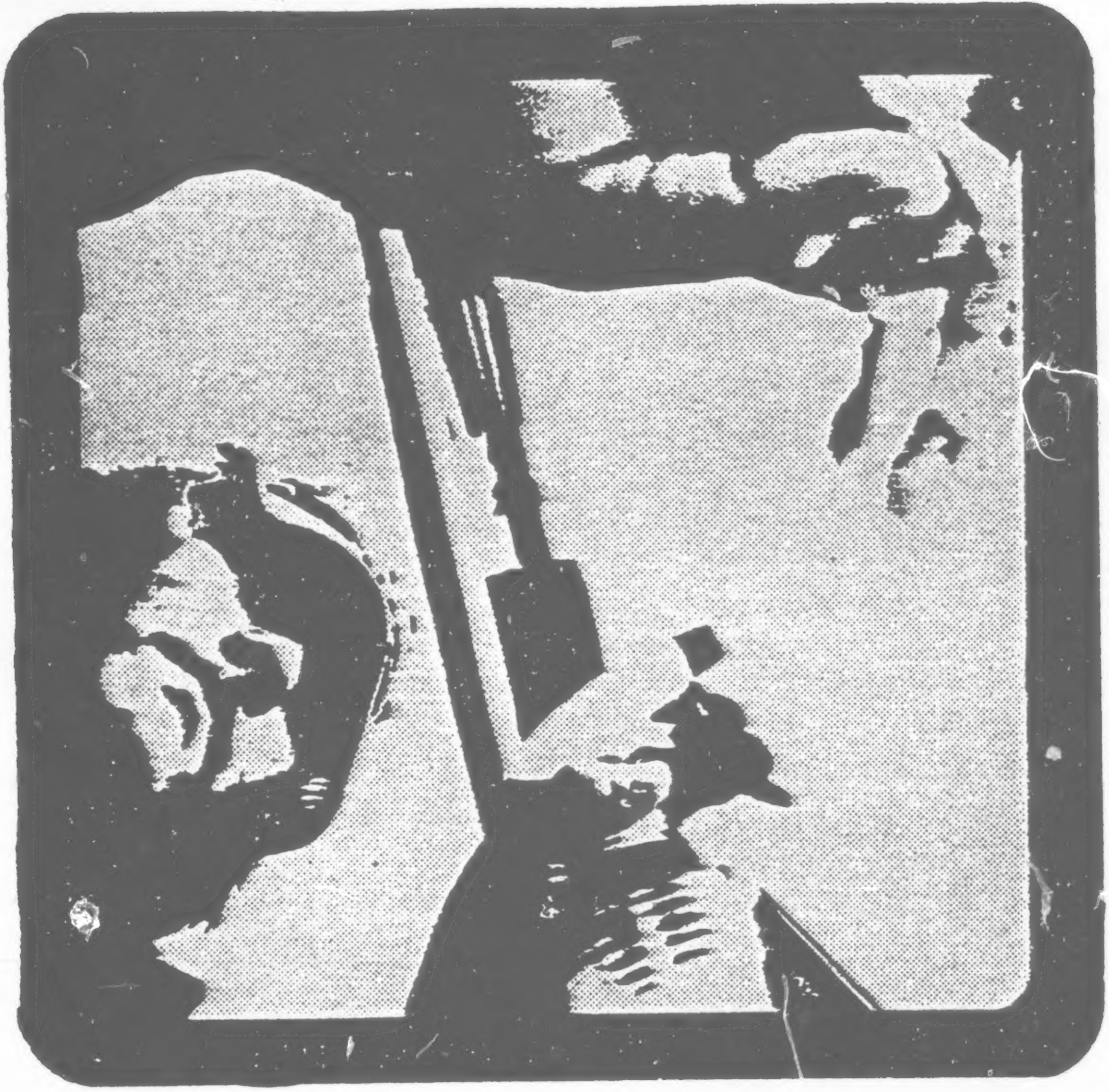


14. Turn off the saw and wait until blade has stopped before picking up cut material.

JOB STEPS

15. Take both your 2 inch piece and 4 inch piece to your instructor.





building maintenance & engineering

unit: POWER TOOLS

capital area career center

module: 2201 20 005 date: 2/77 level: I

skill title: OPERATION OF CIRCULAR SAW

developed & written by: Mike Polen

visuals by: Chuck Knock

WORD GUIDE

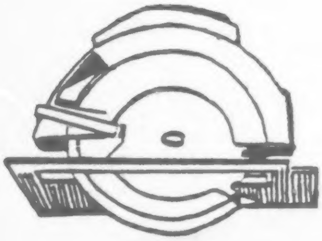
PINCHING - Binding or stopping the blade in the material.

PERFORMANCE OBJECTIVE

You are going to learn:

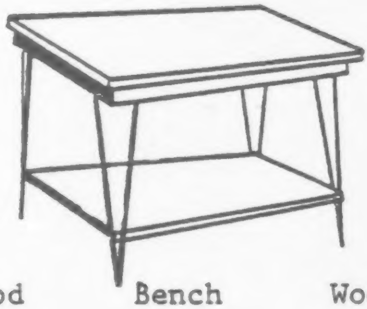
How to use circular saw.

And in order to do this you will need:

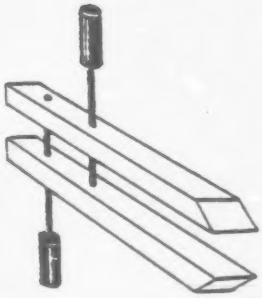


Circular saw

Piece of plywood



Bench



Wood clamps

We will know you can do it when:

You cut through the plywood in a straight line without pinching the saw blade in the material.

WORD GUIDE

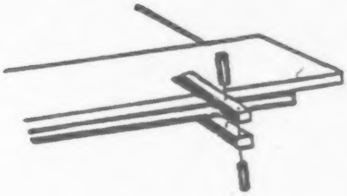
SAW GUARD - Guard that goes around the open part of the blade. It is spring loaded and will always be around the blade when it is not cutting material.

CAUTION:

1. Check saw guard for free movements.
2. Make sure bench is not in line with the cut.
3. Fasten material with a clamp.
4. Keep fingers out from underside of saw table.
5. Push saw slowly and straight through cut.

JOB STEPS

1. Place material on bench so line you will cut is past the end of the bench.



2. Fasten material with wood clamps.

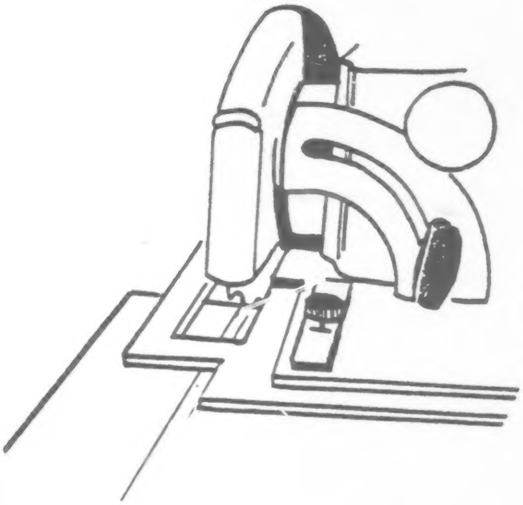
JOB STEPS

3. Plug in cord to an outlet, keeping your finger off the switch.

CAUTION: Be sure you keep the cord away from the blade.

4. Set the blade angle adjustment to cut straight up and down.

5. Place saw on material and line up the saw blade through the cut-out with the line on material.



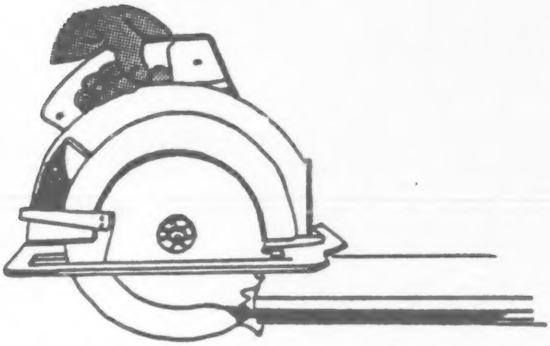
WORD GUIDE

SAW TABLE - The flat top of the saw.

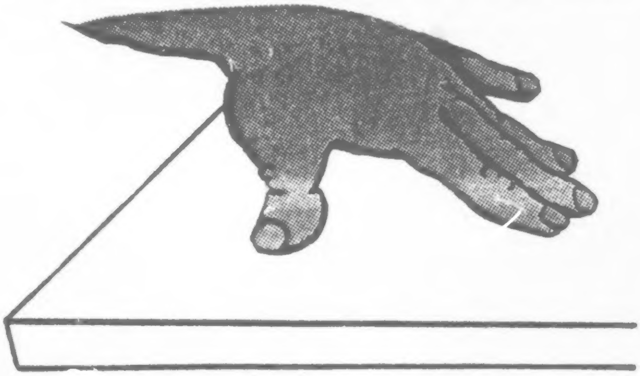
SAW GUIDE - A part that fastens to the side of the saw table and will adjust so it follows the side of the board to keep saw straight.

JOB STEPS

6. For long cuts use the saw guide. Ask your instructor for it.

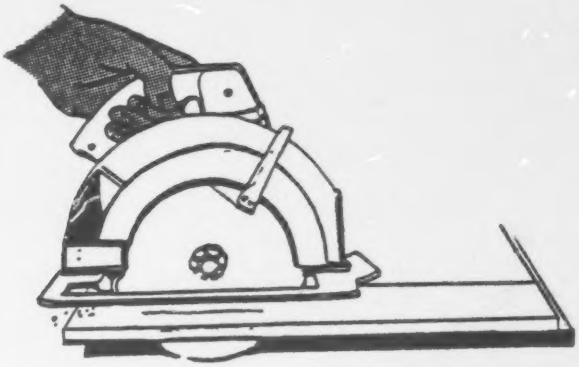


7. Place left hand on the upper left corner of saw table, so thumb and other fingers are on the material.

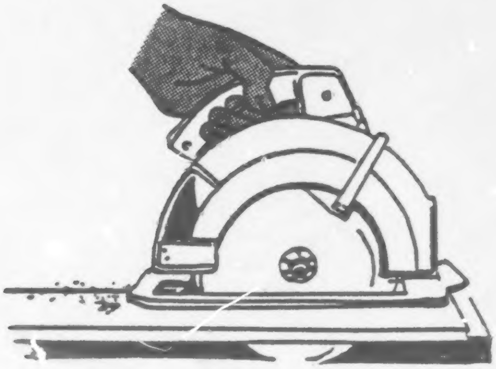


JOB STEPS

8. Press switch and push saw slowly and firmly forward with the right hand, using left hand as a guide.



9. Do not stop forward movement until material is cut off.

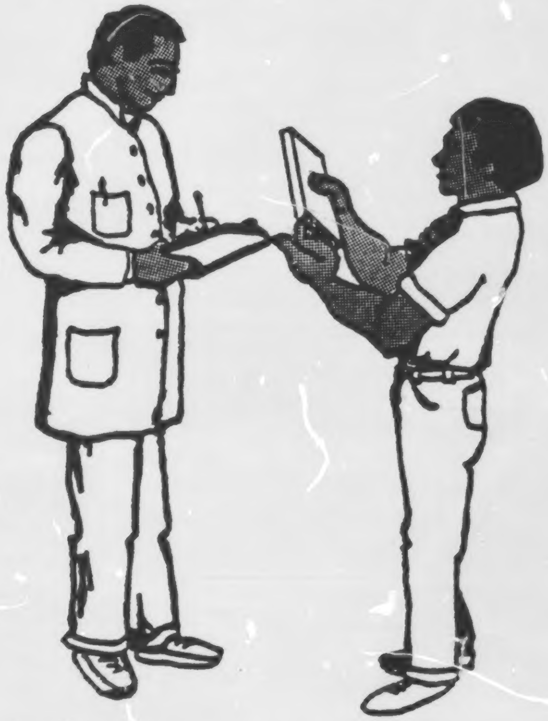


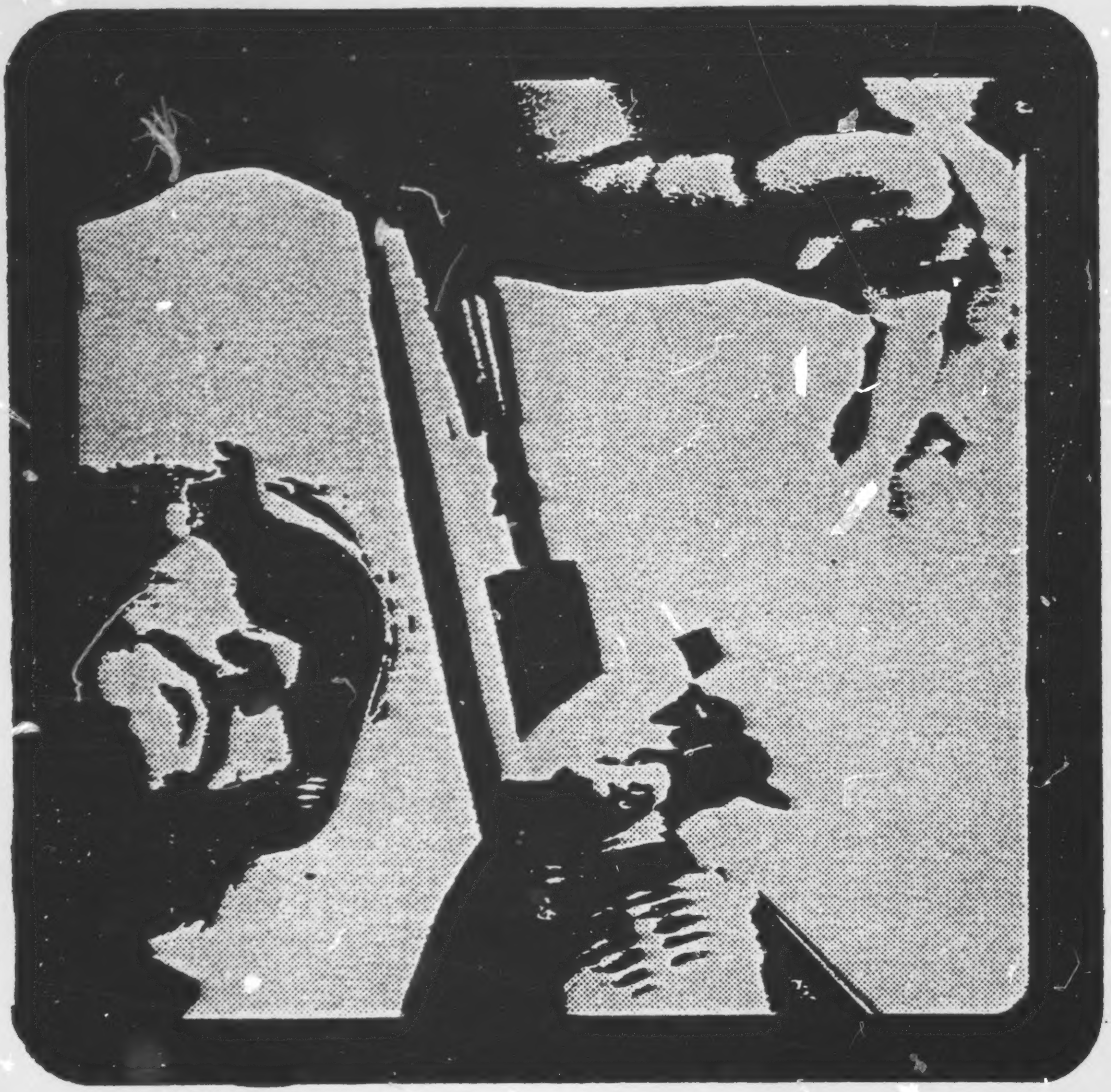
JOB STEPS

10. Release switch and place saw down on work table.

CAUTION: Be sure saw guard is over the blade before you put saw down.

11. Show the piece of wood you have cut to your instructor.





building maintenance & engineering

unit: Power and Hand Tools

capital area career center

module: 2201 20 007 date: 4-1-77 level: 1

skill title: Use of Electric Router

developed & written by: Roy Haske

visuals by: Chuck Knock

WORD GUIDE

DESIGN CUT - a planned design you want to rout out.

PERFORMANCE OBJECTIVE

You are going to learn:

How to operate an electric router.

And in order to do this you will need:

lumber

router

router bits

We will know you can do it when:

You can make a smooth, even design cut with 45° corners.

JOB STEPS

SAFETY

Unplug tool when installing or removing bits. Keep a tight grip on tool at all times. Never lay tool down until bit stops turning. Keep away from clothing at all times.

1. Switch A in OFF position. Pull it out as far as it will go. This locks the drive shaft.

2. Loosen lock-nut C until opening is large enough to insert Bit D.

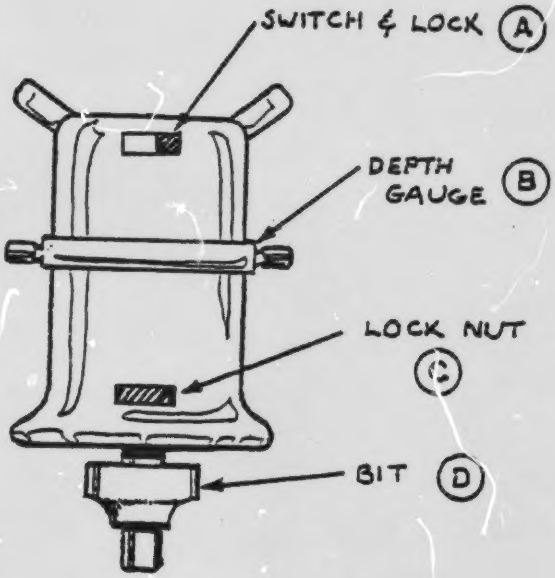
3. Tighten lock-nut C.

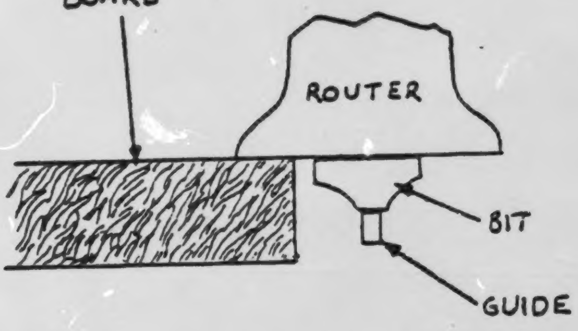
4. Push switch and lock A in as far as it goes. Bit D should turn free.

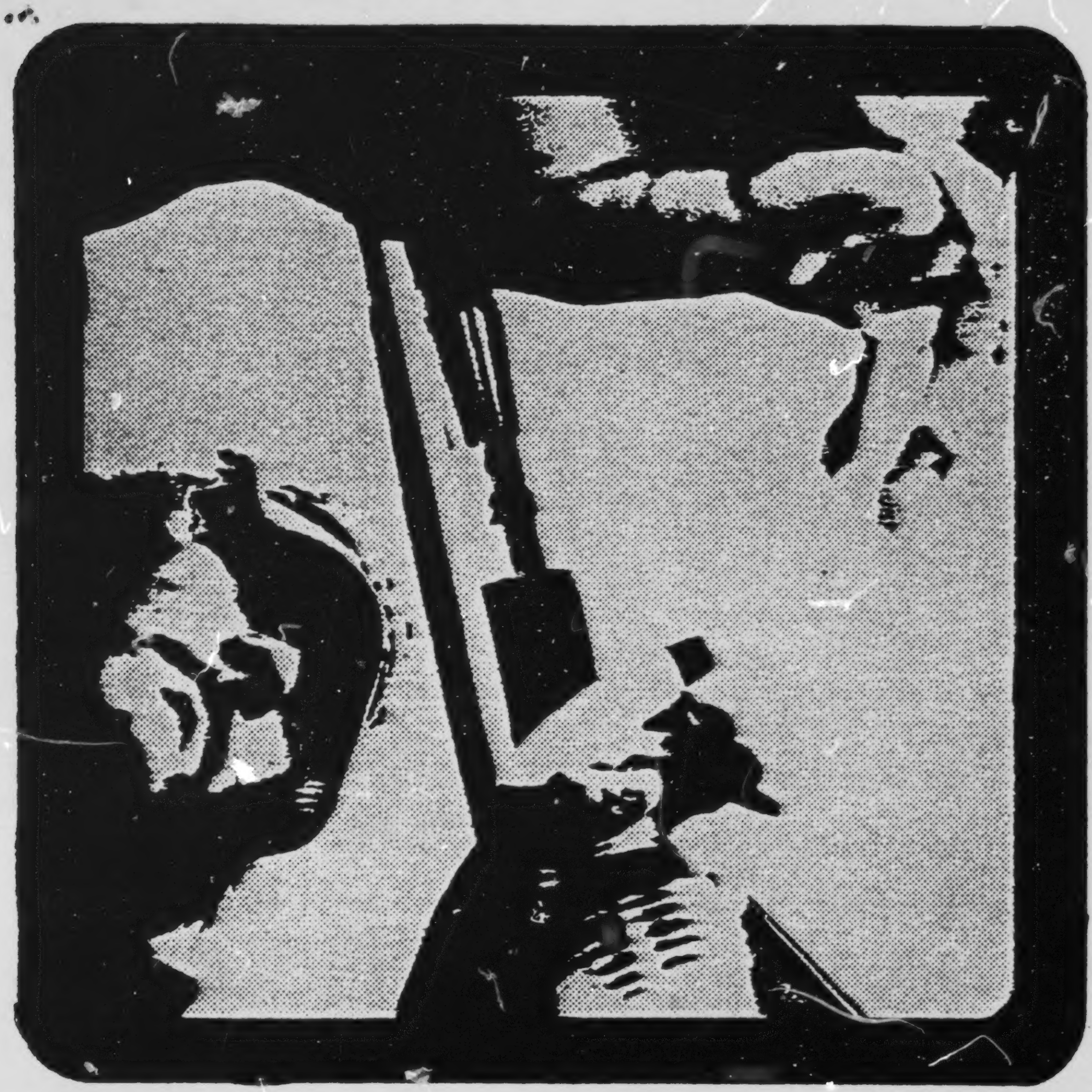
5. Place tool on edge of board.

6. Turn depty gauge until top of bit is level with top of board.

7. The bottom end of the bit is the guide. It slides along the edge to make a smooth straight cut.







building maintenance & engineering

unit: Power & Hand Tools - Carpet Maintenance

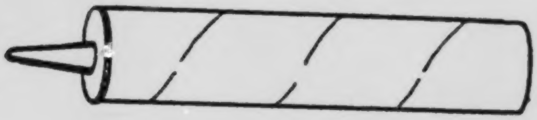
capital area career center

module: 2201 20 008 date: 2/11/77 level: I

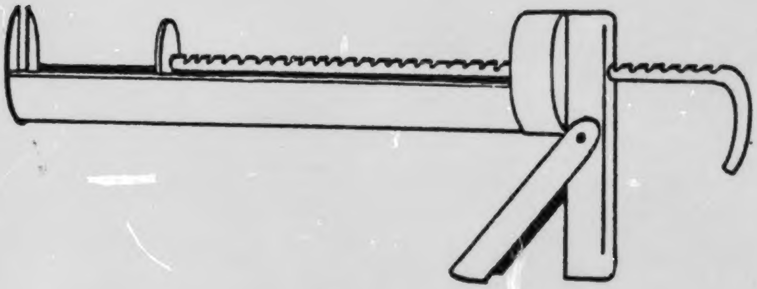
skill title: How To Load, Use, And Unload A Caulking Gun

developed & written by: Roy Haske

visuals by: Marie Gougeon



PERFORMANCE OBJECTIVE



You are going to learn:

How to load, use, and unload a caulking gun.

And in order to do this you will need:

caulking tube

caukling gun

an area to caulk

We will know you can do it when:

You can load the gun, run a bead that is smooth and free of wrinkles, unload the gun and return it to the proper place.

WORD GUIDE

CAULKING - A sticky paste.

INFORMATION

You need this information because:

In construction, caulking prevents water and air leakage.

Read:

Building Maintenance, J. Oravetz, pgs. 235-243.

Caulking is a material which can be used on many surfaces such as window frames to seal out air or water.

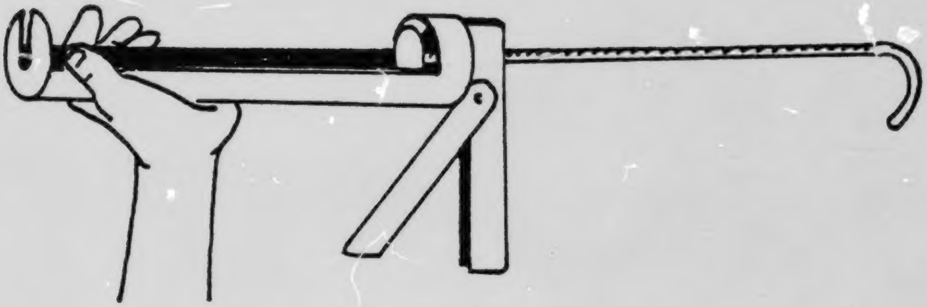
WORD GUIDE

CAULKING GUN - Tool used to apply the paste.

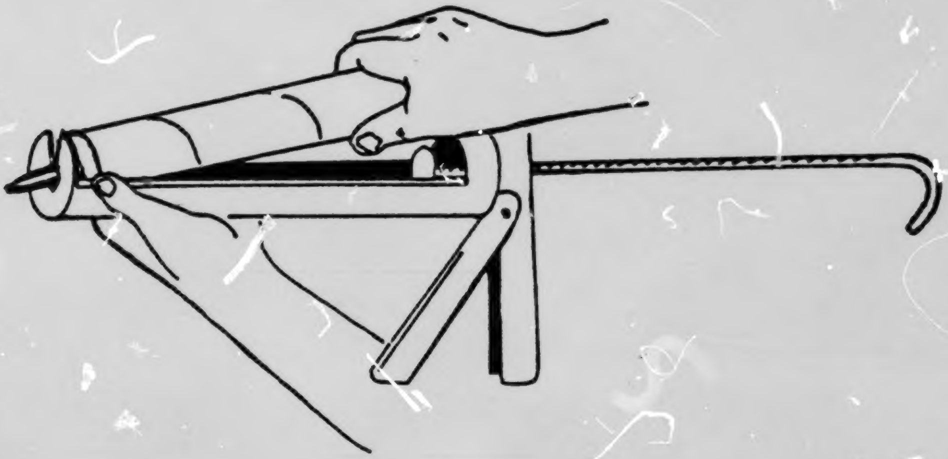
JOB STEPS

1. Get your equipment and go to the work area.

2. On one hand, hold the caulking gun with opened tip facing up.

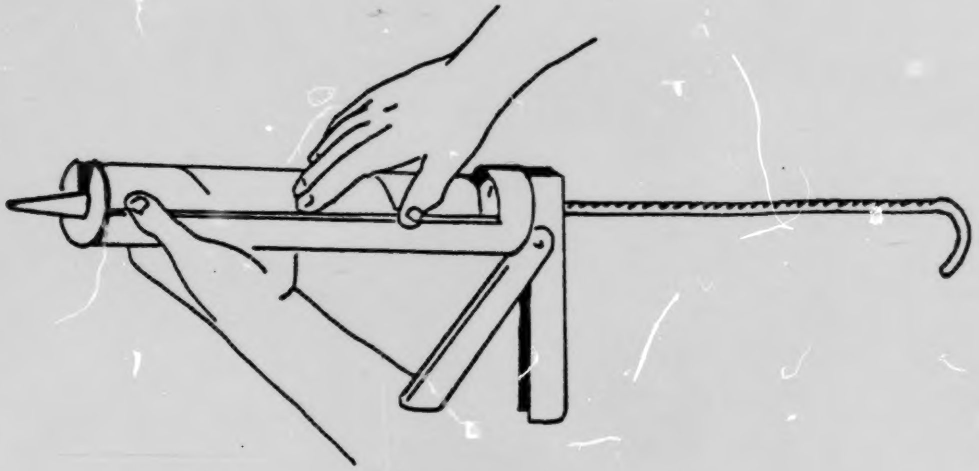


3. Place caulk tube (pointed end) through the round hole of the gun as far as it will go.

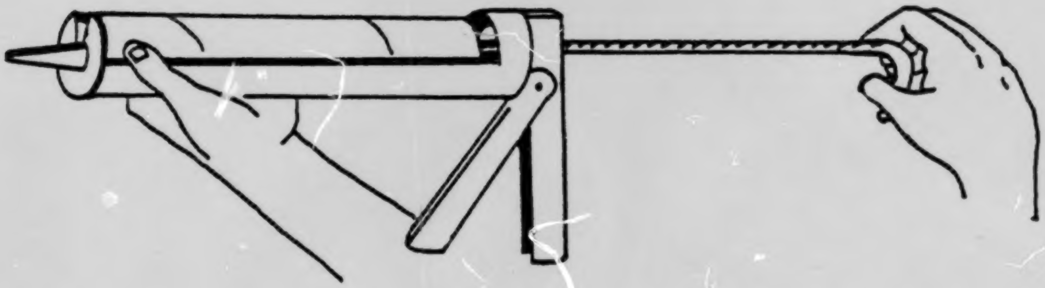


JOB STEPS

4. Push other end of tube down into gun frame.



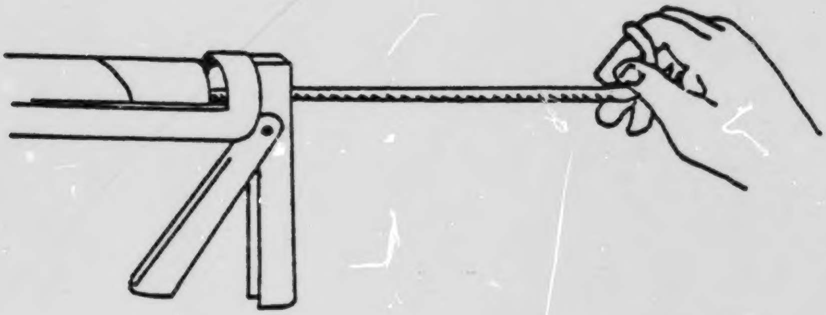
5. Turn plunger rod with teeth facing up. Push rod into the tube as far as it will go.



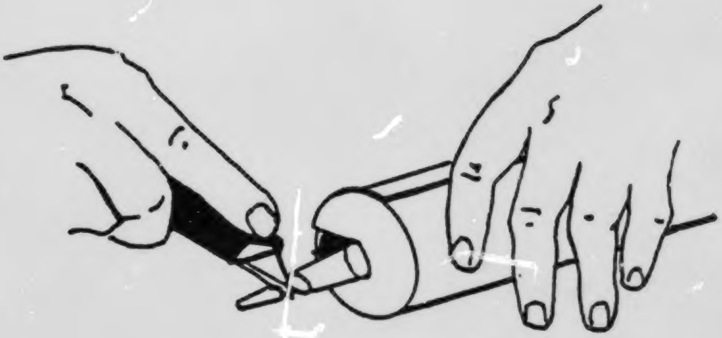
JOB STEPS

6. Turn the rod until the teeth are facing down.

NOTE: This lines up the trigger with the teeth, forcing the plunger into the tube.

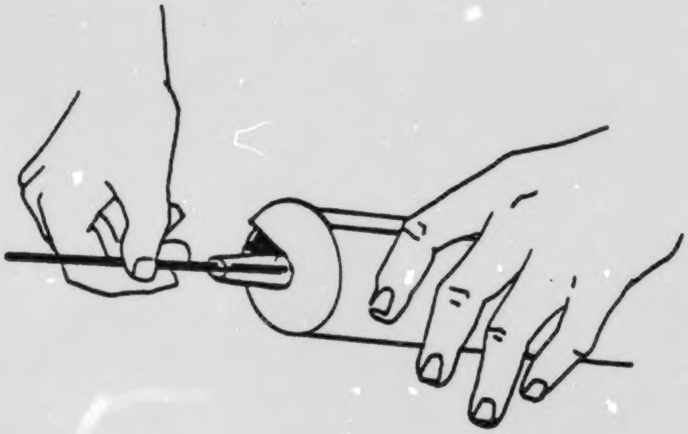


7. Using a sharp knife, trim off the plastic tip on a slight angle.

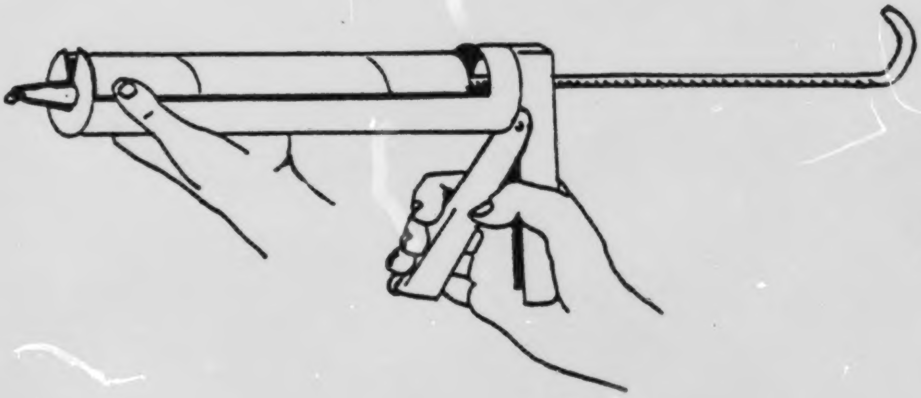


JOB STEPS

8. Push a heavy wire into the tip and break the thin seal in the tube.

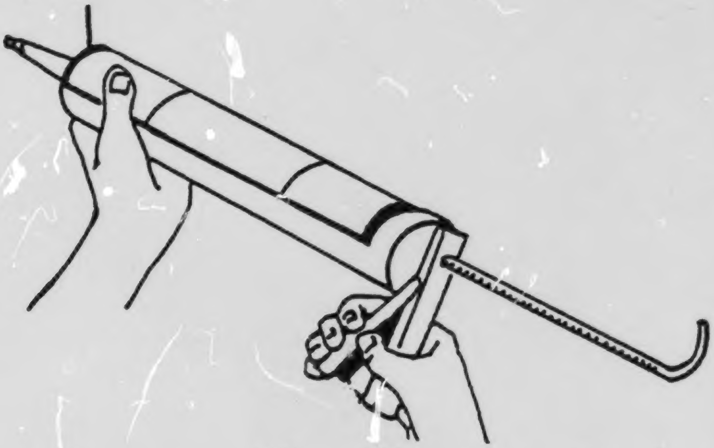


9. Squeeze the trigger all the way back. Release it so it will line up with the next tooth on the rod.



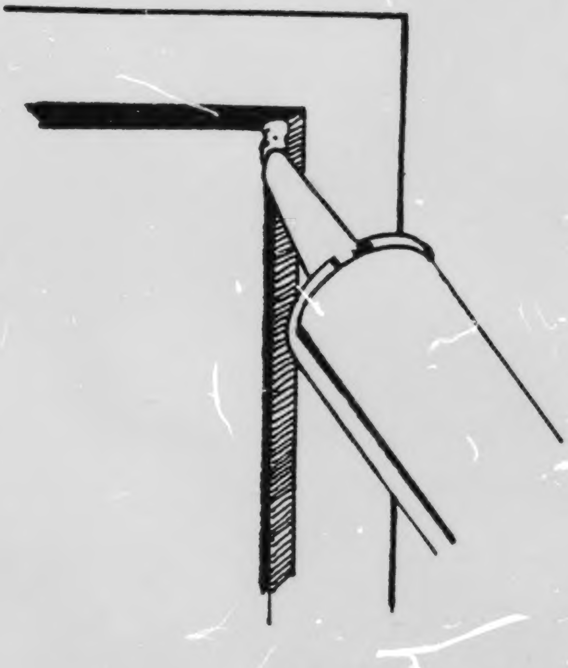
JOB STEPS

10. Squeeze the trigger again the same way as in step #9. By this time, the caulking should be moving out of the plastic end.



11. Now you are ready to use the caulking gun on a job. Ask your instructor to assign you a window to caulk.

12. Place plastic tip at the top of the window frame, where the siding meets the frame.



WORD GUIDE

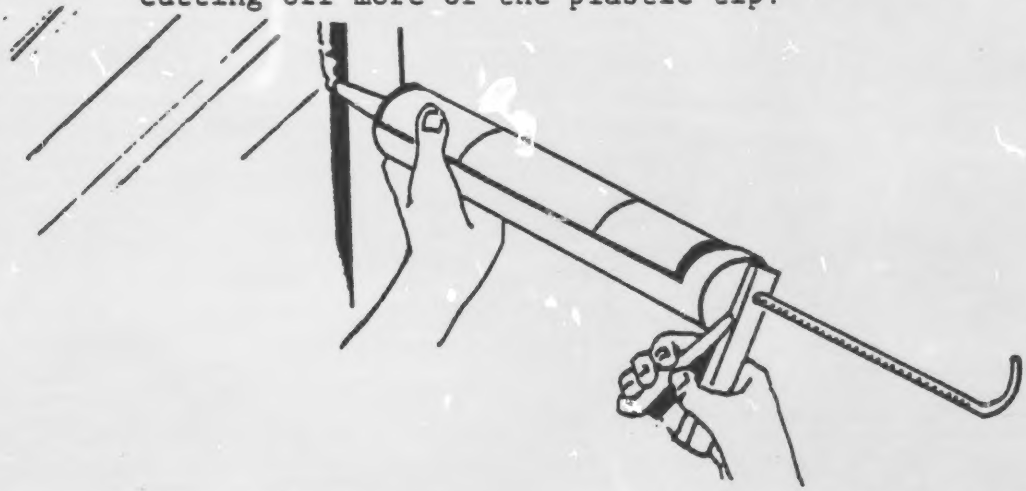
SEAM - Whenever two surfaces or edges meet, this spot is called a seam.

JOB STEPS

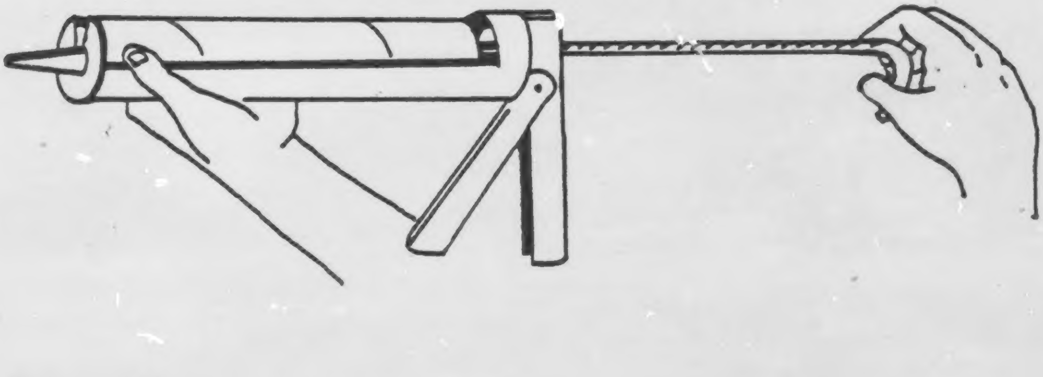
13. Squeeze the trigger slowly and move the gun down slowly, at the same time.

NOTE: This forces the caulking into the crack and leaves a smooth, even layer on the outside.

NOTE: You can enlarge the size of the caulking seam by cutting off more of the plastic tip.

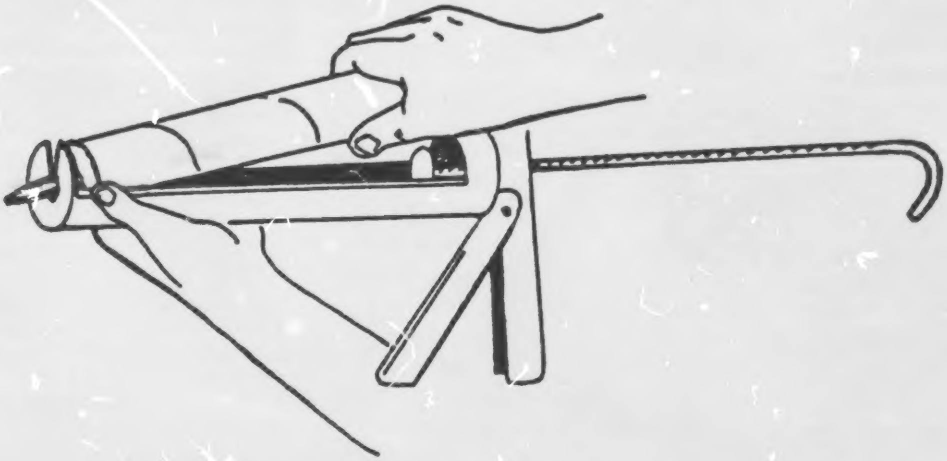


14. To unload the gun, first turn the plunger rod so the teeth are pointing up. Then, pull it back as far as it will go.



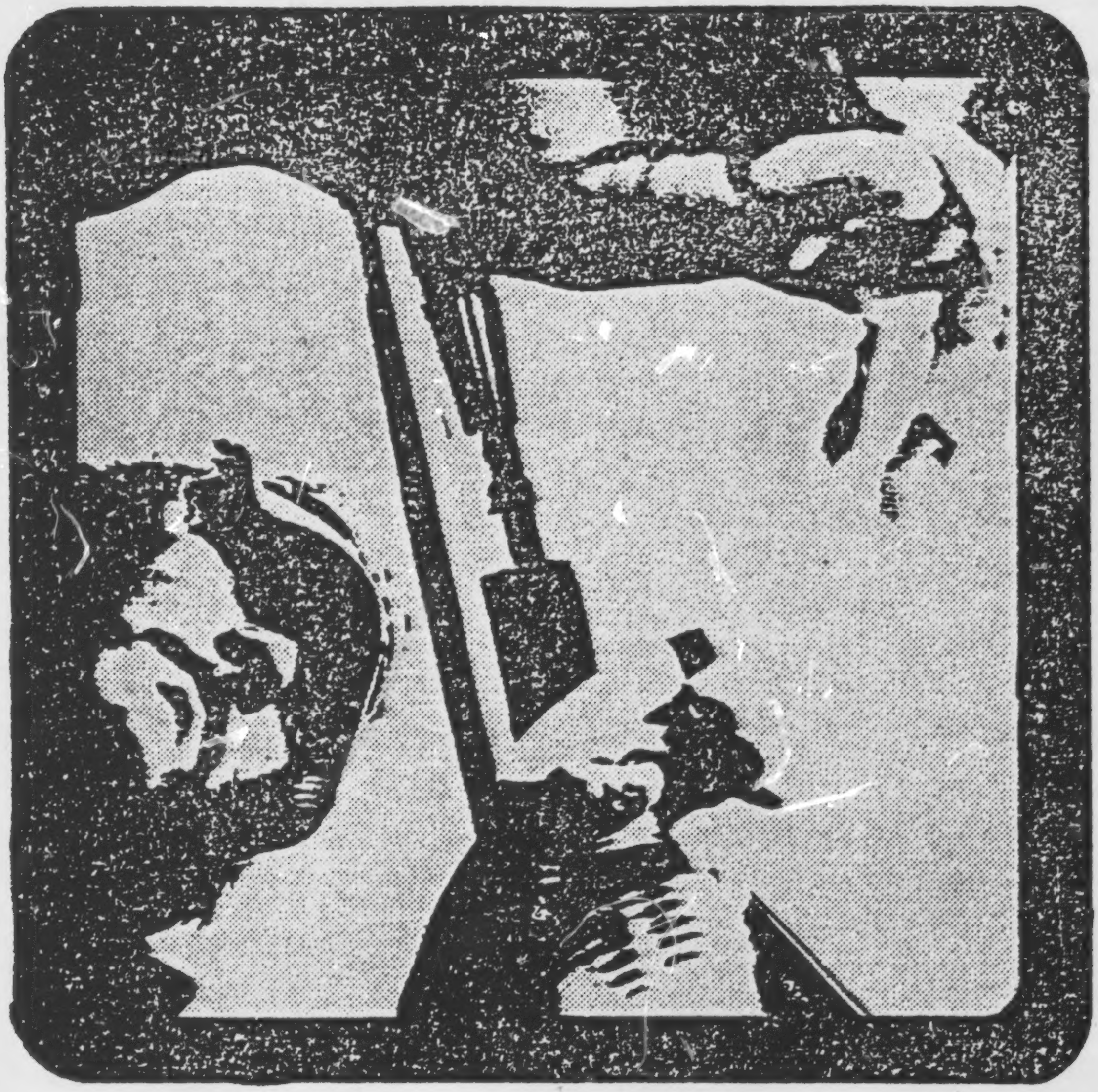
JOB STEPS

15. To clear the gun casing, lift up the caulk tube at the end opposite the tip. Pulling the tip out of the round hole.



16. Place a small piece of tape over the tip of the tube. This keeps air out and caulking in the tube.

17. Put gun and tube back in their cabinet.



building maintenance & engineering

unit: Carpenter Maintenance

capital area career center

module: 2201 20 009 date: 5/3/77 level: II

skill title: How To Use The Radial Arm Saw

developed & written by: Roy Haske

visuals by: Glen Cooley

PERFORMANCE OBJECTIVE

You are going to learn:

How to use the Radial Arm Saw.

And in order to do this you will need:

A piece of lumber

A Radial Arm Saw

A tape measure

A pencil

We will know you can do it when:

You follow all safety rules when cutting a piece of wood, and your cut is accurate to plus or minus 1/16".

INFORMATION

Read the Safety Rules on the next page.

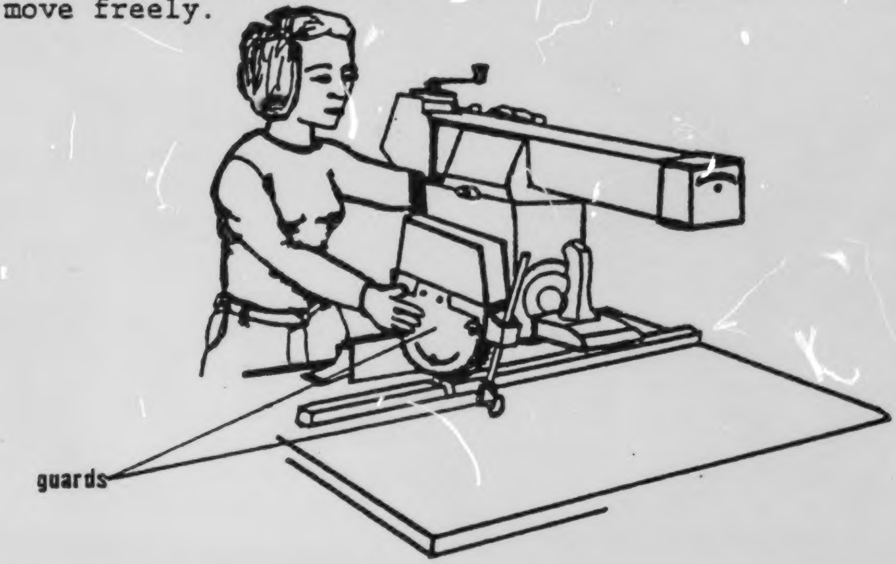
Ask the instructor about anything you don't understand.

JOB STEPS

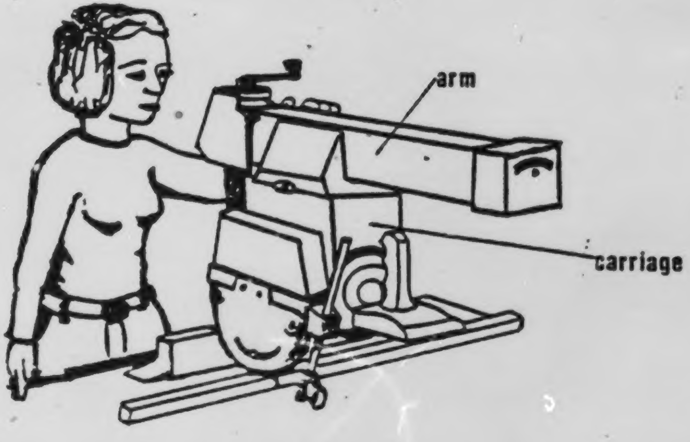
1. Do a safety inspection.

1 - Make sure the table and floor area around the saw is clear of chunks of wood.

2 - Be sure that the saw guards on the top and on each side move freely.



3 - Be sure that the carriage and arm move freely and return to start position.



4 - Put on safety glasses.

WORD GUIDE

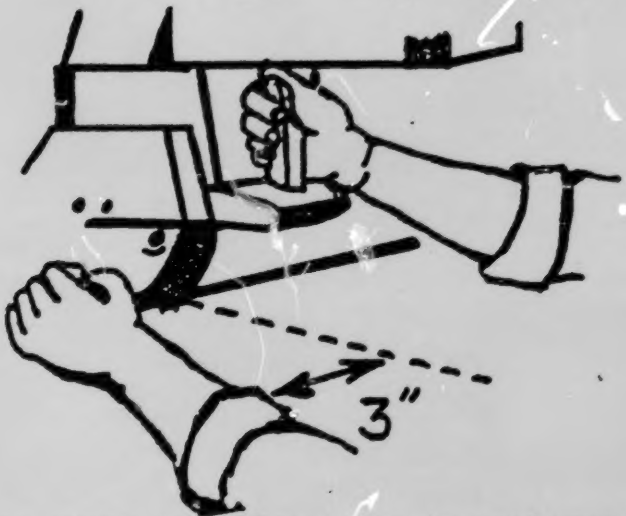
ADJUSTMENTS - Changing the saw setting so it will cut the depth you want.

RIP - Cutting the length of a board.

CROSS-CUT - Cutting across the wood grain.

JOB STEPS

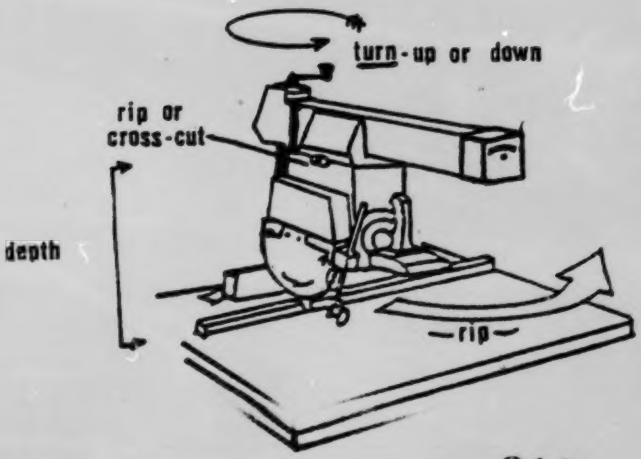
5 - Keep your fingers at least 3 inches away from the saw path.



6 - Be sure that power is off and saw is unplugged when you make adjustments or change blades.

2. Measure material for cutting.

3. Adjust the saw for depth, rip or cross-cut.



WORD GUIDE

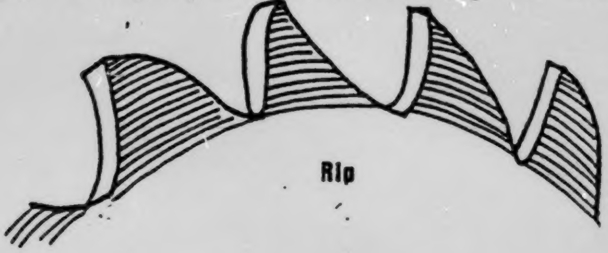
PROPER BLADE - Either a rip blade or cross-cut blade.

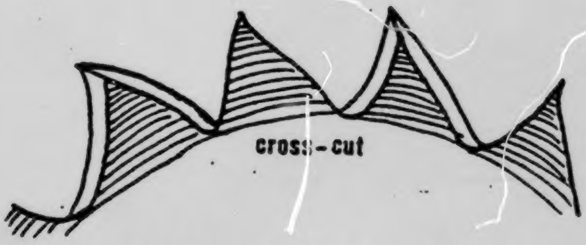
ANTI-KICK-BACK - Tool that stops material from coming back at you at the end of a cut.

WOOD PUSH TOOL - A narrow piece of wood that is placed on the edge of material when it is closer than 3 inches from the blade.

JOB STEPS

4. Select and use proper blade for rip or cross-cut.





5. If ripping, adjust anti-kick-back tool to thickness of material.

6. Place material into position on table.

7. Start saw and slowly push material into the blade.

8. Use wood push tool at end of cut, if you are ripping material.

9. Turn off saw.

building maintenance & engineering

unit: POWER TOOLS

capital area career center

module: 2201 20 011 date: 2/77 level:

skill title: Using a Screwmate Tool

developed & written by: Mike Polen

visuals by: Bill Draper

PERFORMANCE OBJECTIVE

You Are Going To Learn:

How to adjust and use the screwmate tool.

And In Order To Do This You Will Need:

Screwmate tool	Screwdriver
Electric drill	Screw

We Will Know You Can Do It When:

You have adjusted the screwmate to the shape of the screw. When you have finished drilling, the screw is turned so that the flat head of the screw is at least 1/16th of an inch below the wood surface.

JOB STEPS

****

CAUTION! Unplug the drill before using chuck wrench.

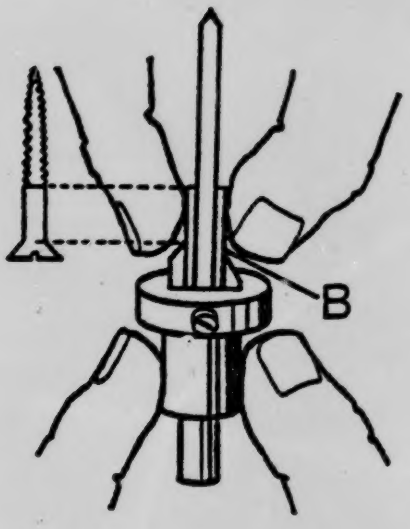
****

1. Choose the correct size screw for the job - length and thickness.

2. Get the screwmate tool made for screw selected and adjust as follows: (See Fig. 1)

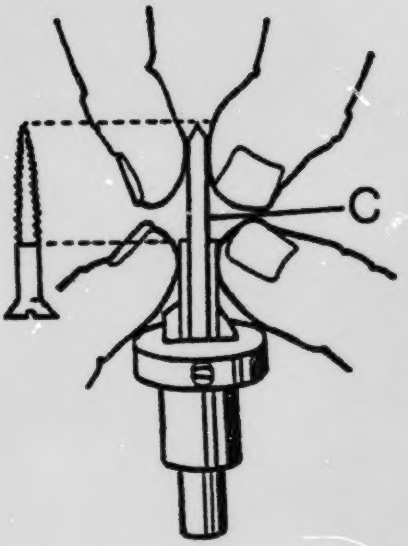
3. Loosen set screw A 1/4 turn with the screwdriver.

4. Move the largest (black) part up or down to fit the length of the smooth part of the screw. (See B)

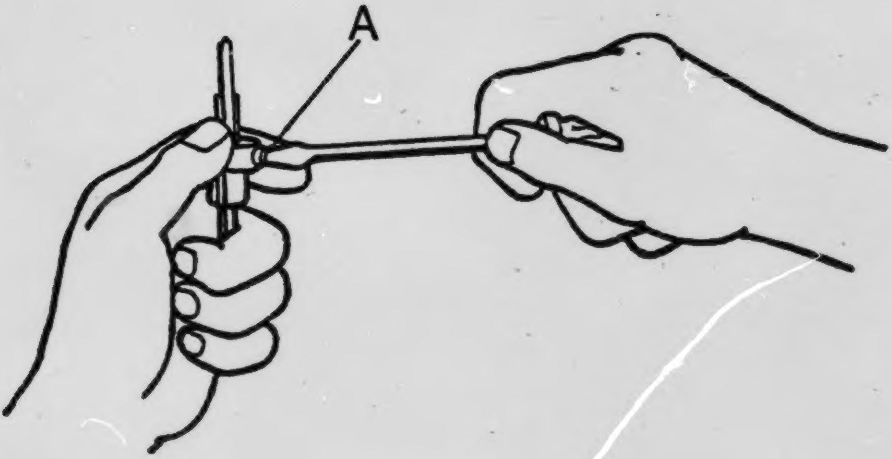


JOB STEPS

5. Hold black part in place and move the smaller part to the length of the screw. (See C)

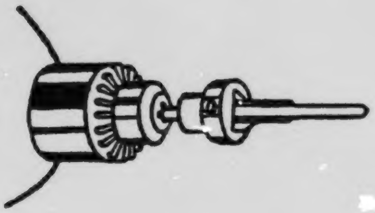


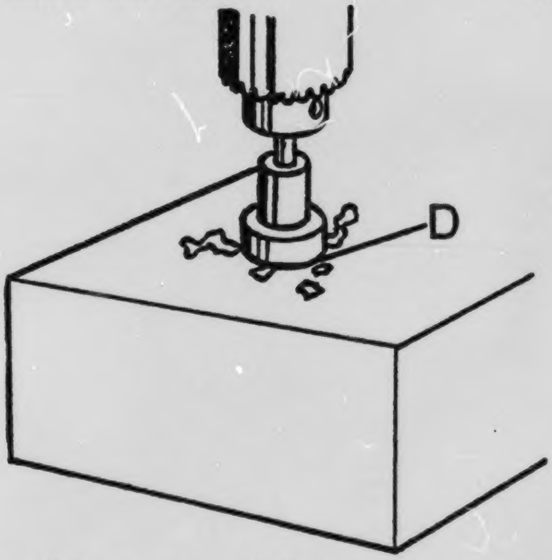
6. With both parts in place, tighten screw A.



JOB STEPS

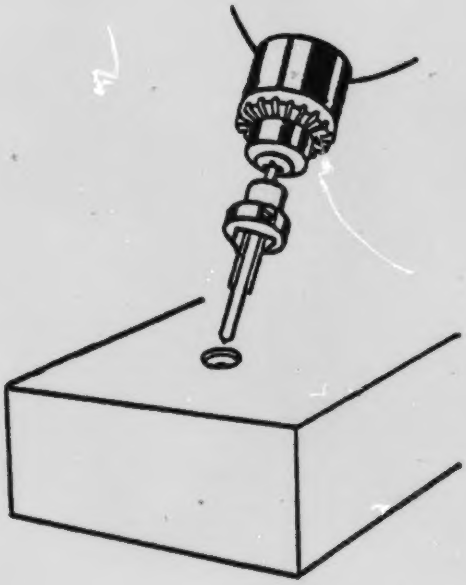
7. Place tool in an electric drill and tighten chuck. Drill into a piece of wood to point D. Remove from the wood.

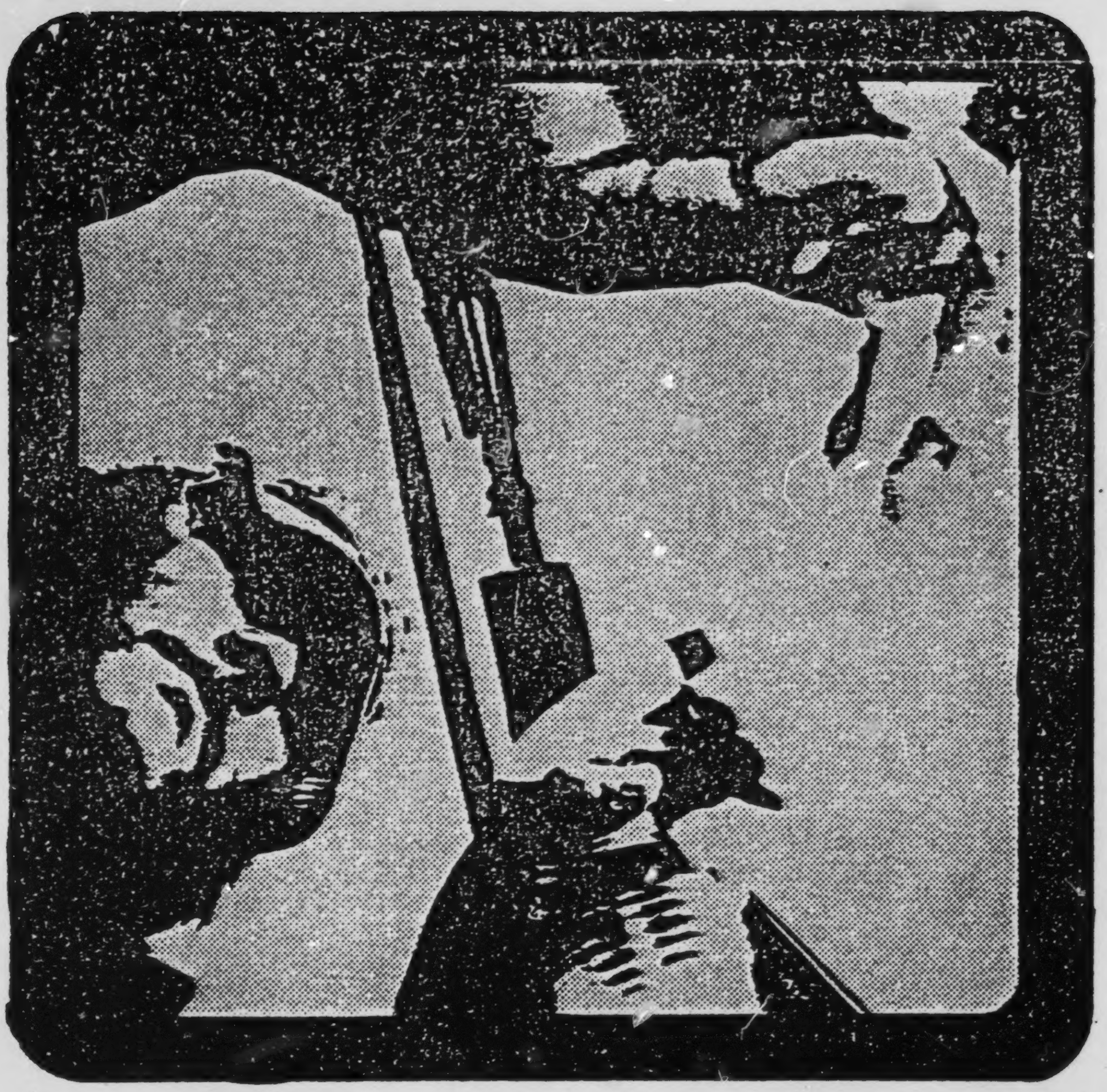




8. Place screw into opening and tighten with a screwdriver.

9. Job should look like this when done.





building maintenance & engineering

unit: Power and Hand Tools

capital area career center

module: 2201 20 012 date: 4/77 level: 1

kill title: Hand Tool Identification

eveloped & written by: Roy Haske

uals by: Chuck Knock

PERFORMANCE OBJECTIVE

You are going to learn:

How to identify hand tools.

And in order to do this you will need:

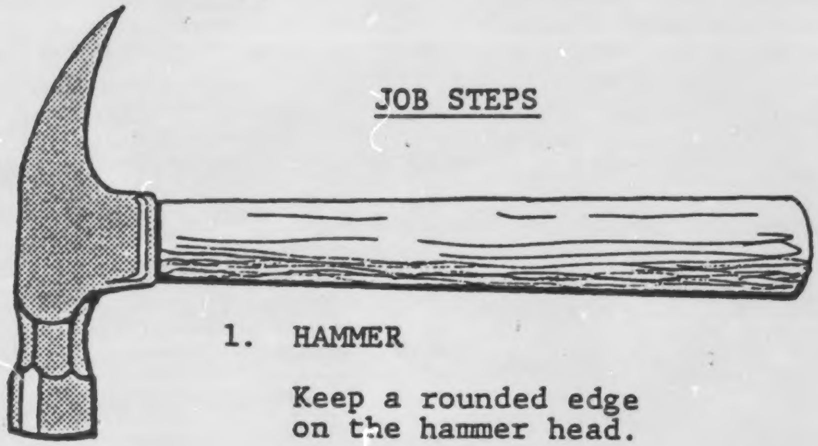
All tools listed in this module.

We will know you can do it when:

You are able to tell the instructor the name of each tool with no errors.

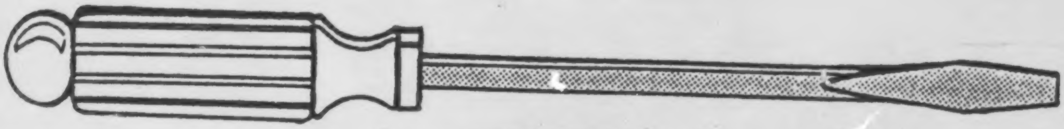
INFORMATION	MATERIALS	LOCATION OF MATERIALS
1. Study the pages in this mod until you can name the tools in any order the instructor asks you to.		
2. To practice, ask your instructor to give you the flash cards. Look at each drawing and say the name to yourself. Then check your answer on the back of the card. Mix the cards and try again. When you can name all the tools in any order, then tell your instructor you are ready for the test.		

JOB STEPS



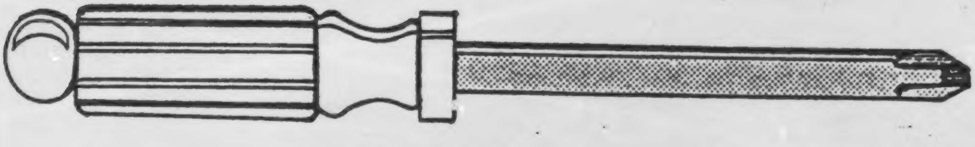
1. HAMMER

Keep a rounded edge on the hammer head.

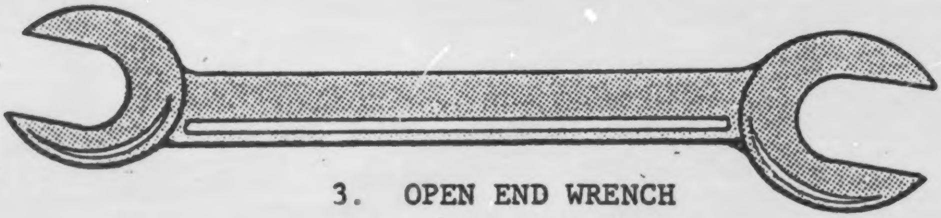


2a. SCREWDRIVER

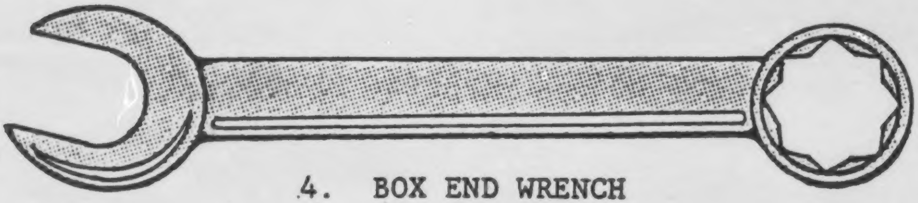
Kept straight and flat at screw end.



2b. PHILLIPS SCREWDRIVER



3. OPEN END WRENCH

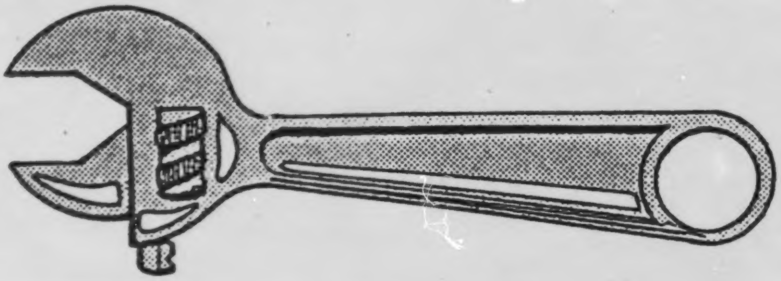


4. BOX END WRENCH

JOB STEPS

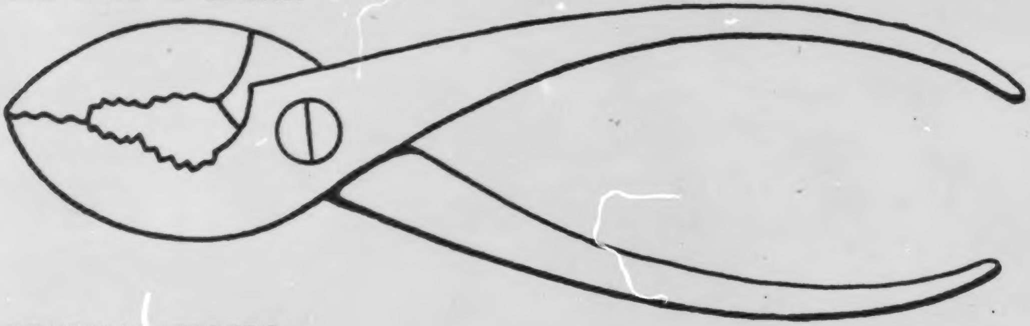
5. ADJUSTABLE WRENCH

Drop of oil once
a month.



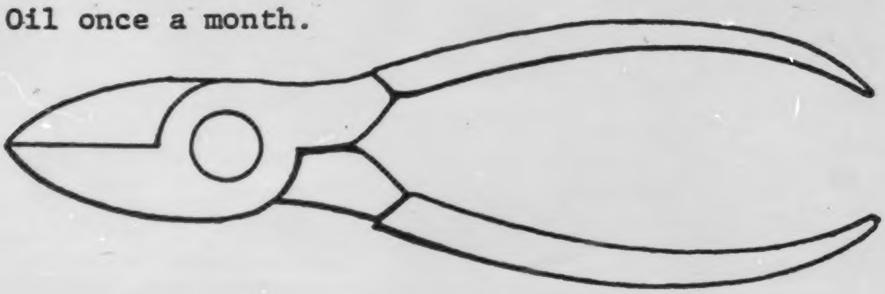
6a. PLIERS

Oil once a month.



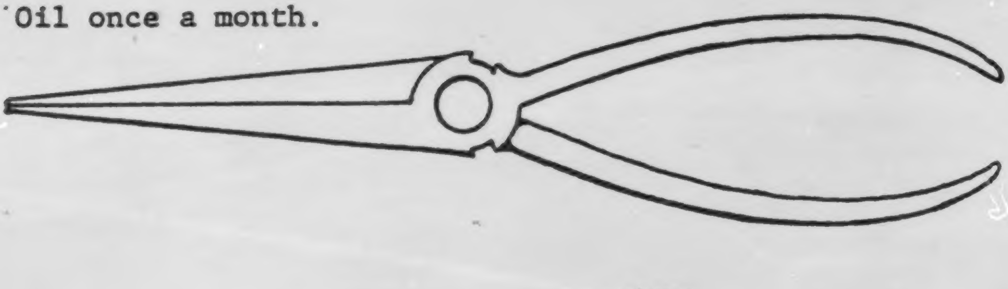
6b. DIAGONAL PLIERS

Oil once a month.

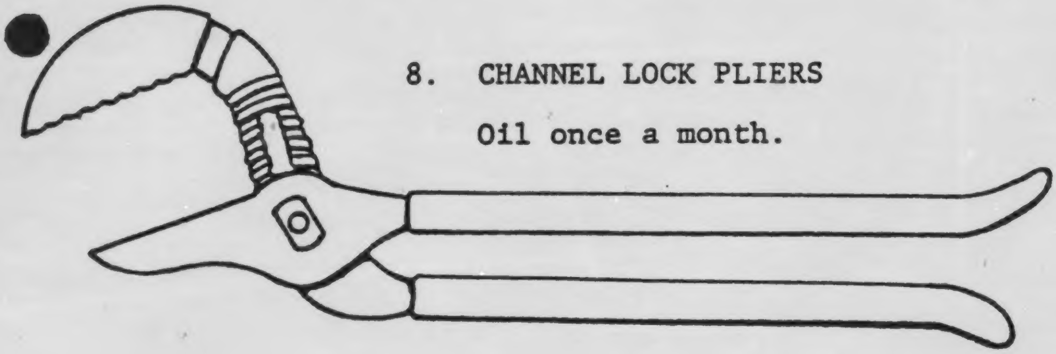


7. NEEDLE NOSE PLIERS

Oil once a month.

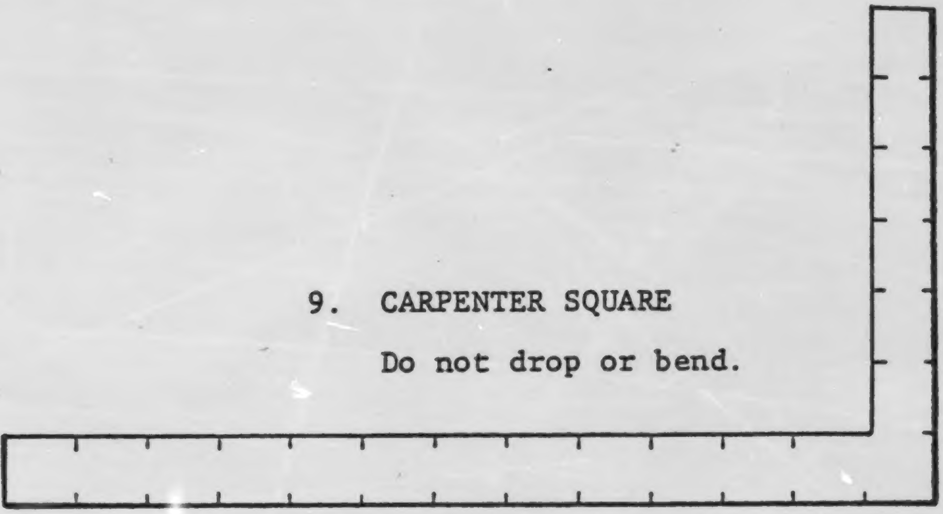


JOB STEPS



8. CHANNEL LOCK PLIERS

Oil once a month.

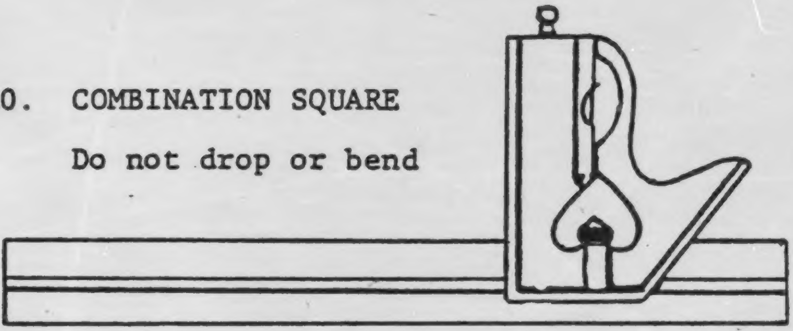


9. CARPENTER SQUARE

Do not drop or bend.

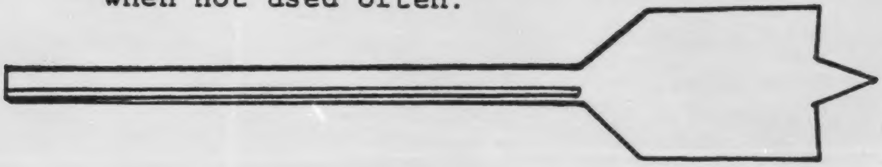
10. COMBINATION SQUARE

Do not drop or bend

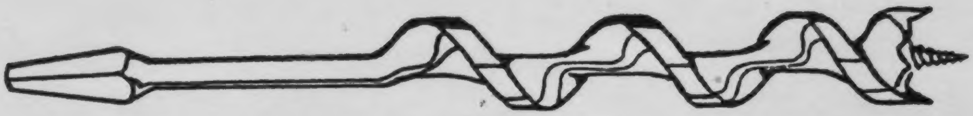


11a DRILL BIT (WOOD)

Wipe with an oily rag
when not used often.

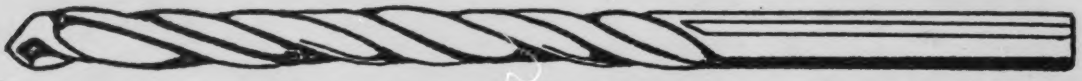


JOB STEPS



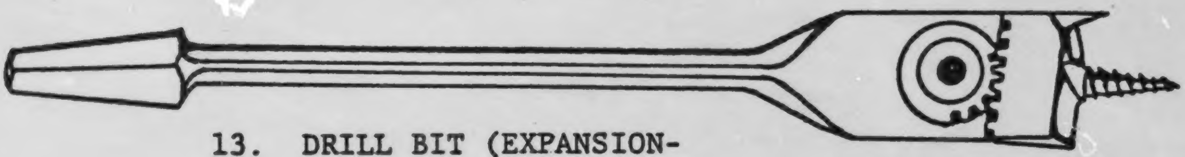
11b. DRILL BIT (WOOD)

Wipe with an oily rag when not used often.



12. DRILL BIT (METAL)

Wipe with an oily rag when not used often.

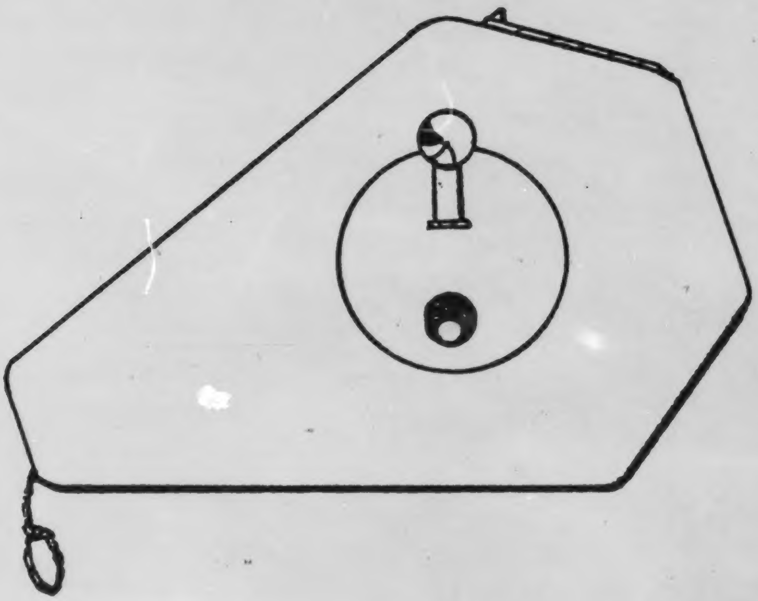


13. DRILL BIT (EXPANSION-WOOD)

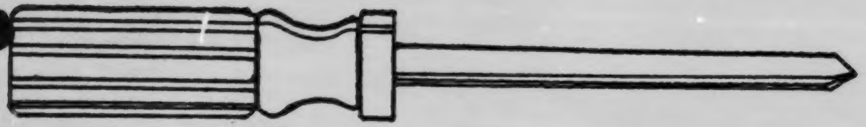
Wipe with an oily rag when not used often.

14. CHALK LINE

Keep a supply of chalk dust in case.

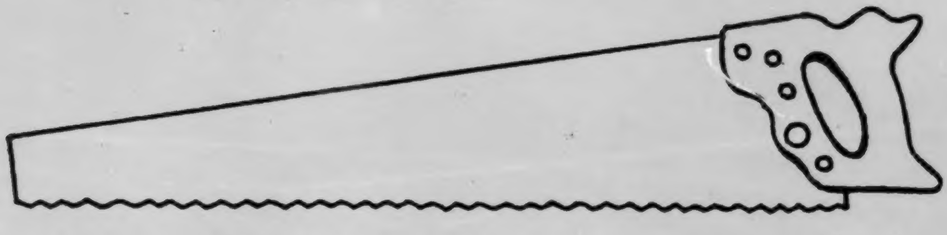


JOB STEPS



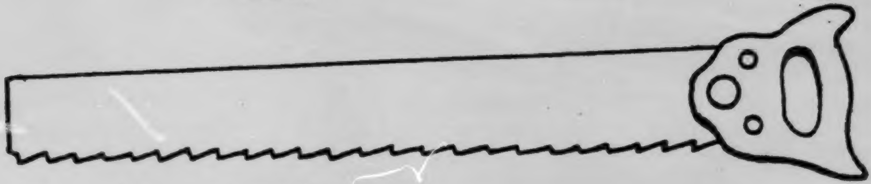
15. CENTER PUNCH

Keep a pointed end.



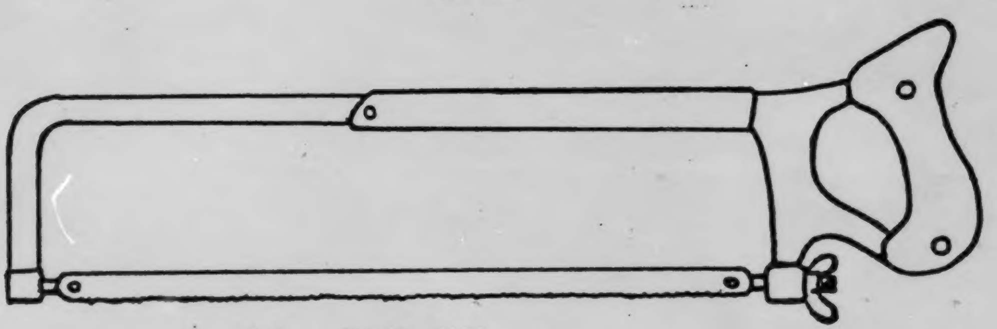
16. CROSSCUT SAW

Keep sharp and
oiled.



17. RIP SAW

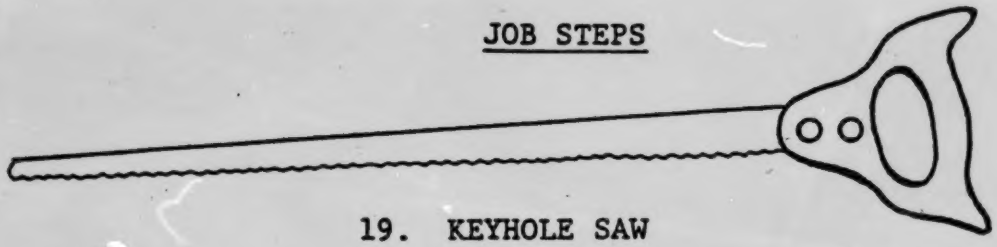
Keep sharp and
oiled.



18. HACK SAW

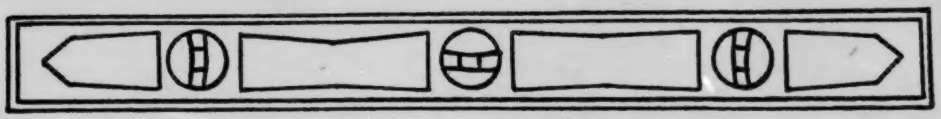
Keep sharp and
oiled.

JOB STEPS



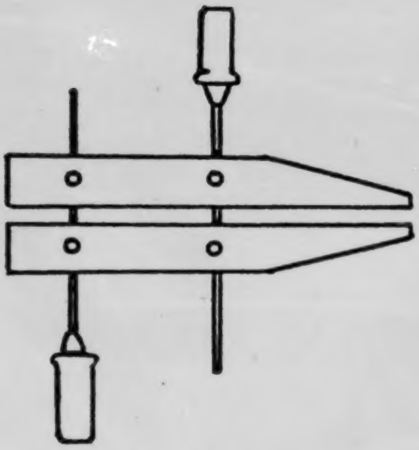
19. KEYHOLE SAW

Keep sharp and oiled.



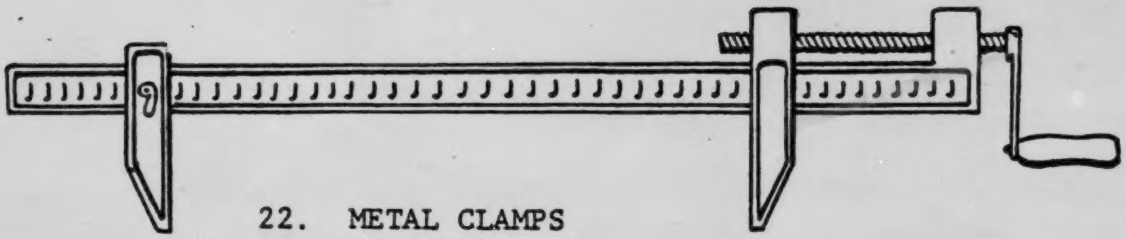
20. CARPENTER LEVEL

Do not drop.



21. WOOD CLAMPS

Oil.



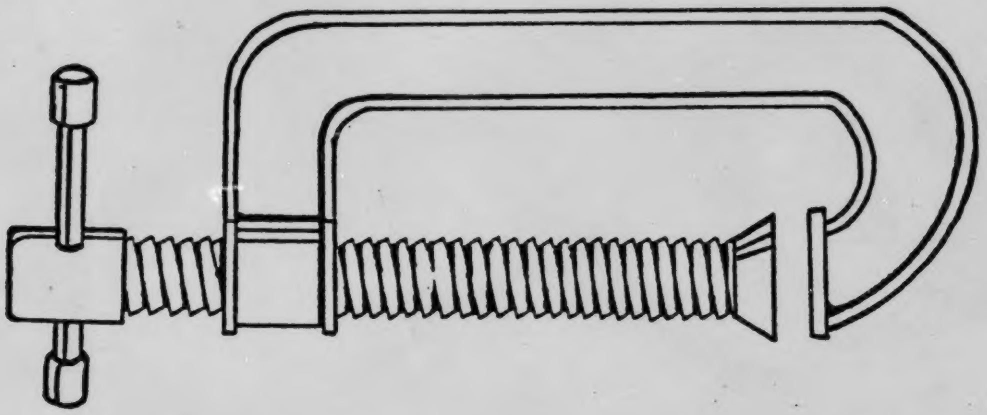
22. METAL CLAMPS

Oil.

JOB STEPS

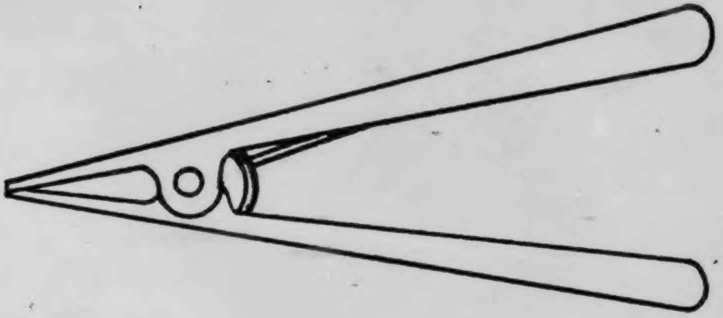
23. "C" CLAMP

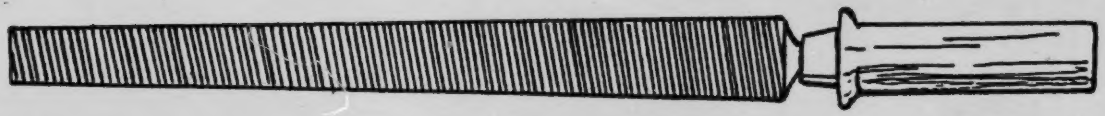
Oil.



24. SPRING CLAMP

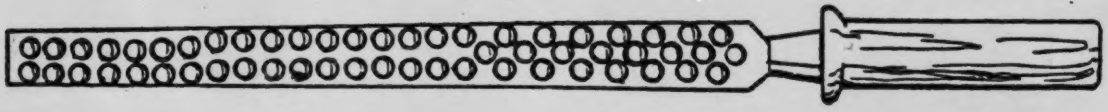
Oil.





25. WOOD FILE

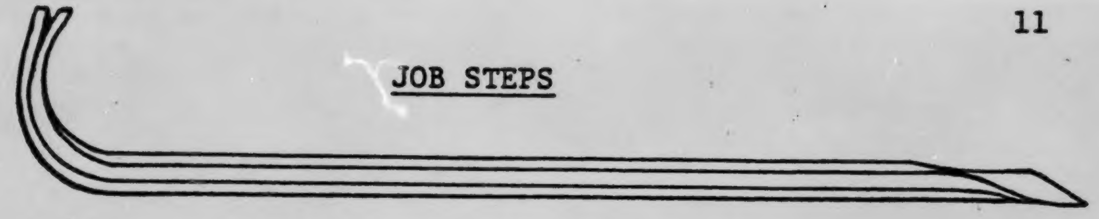
Keep clean.

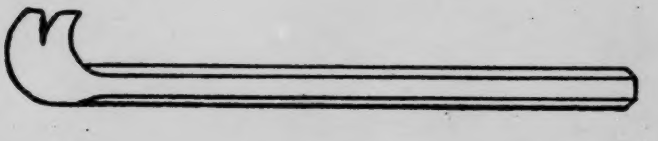


26. RASP (WOOD)

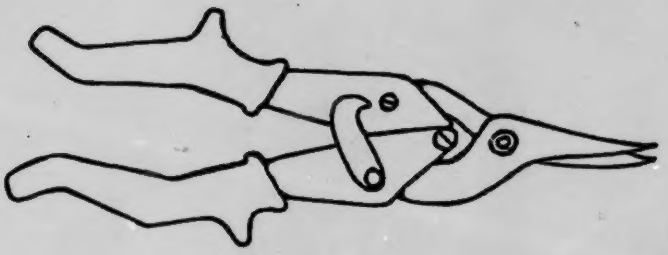
Keep clean.

JOB STEPS



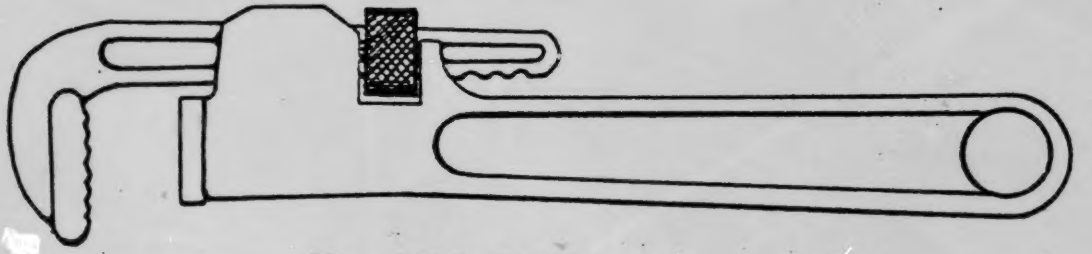


27. WRECKING BAR



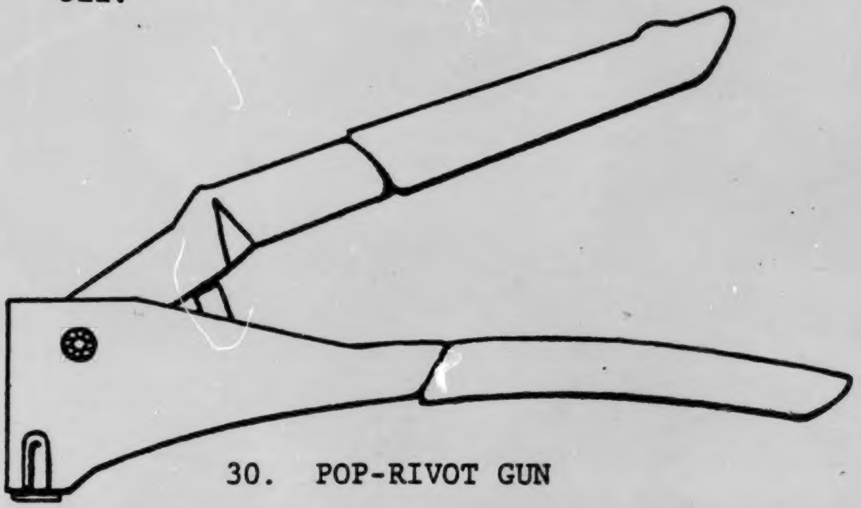
28. TIN SNIPS

Oil.



29. PIPE WRENCH

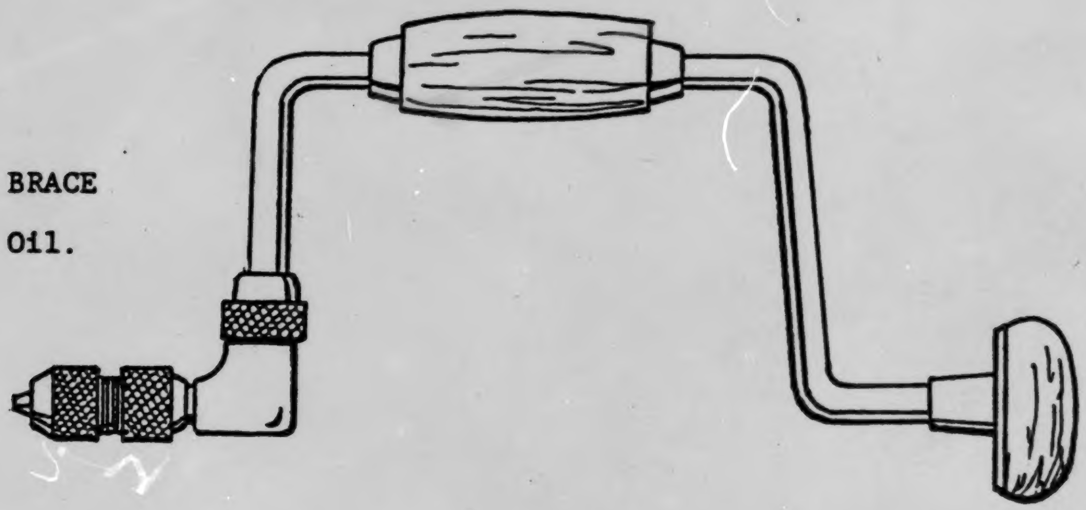
Oil.



30. POP-RIVOT GUN

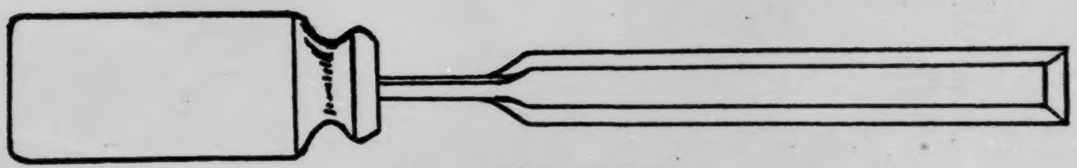
Oil.

JOB STEPS



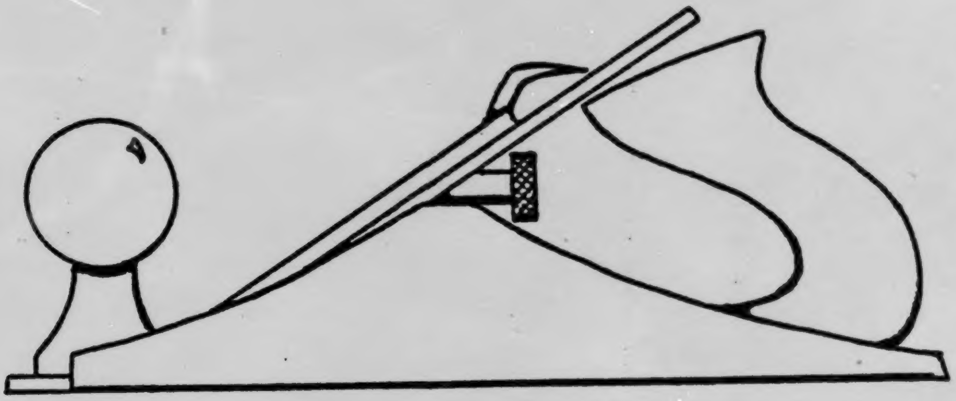
31. BRACE

Oil.



32. WOOD CHISEL

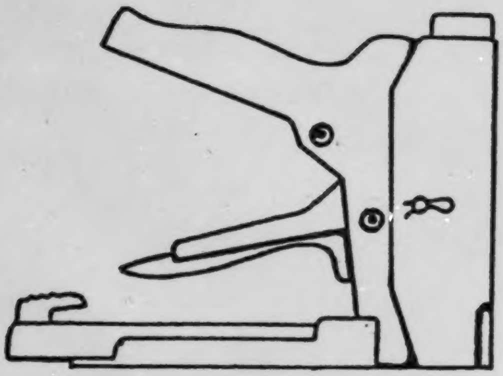
Keep sharp.



33. WOOD PLANE

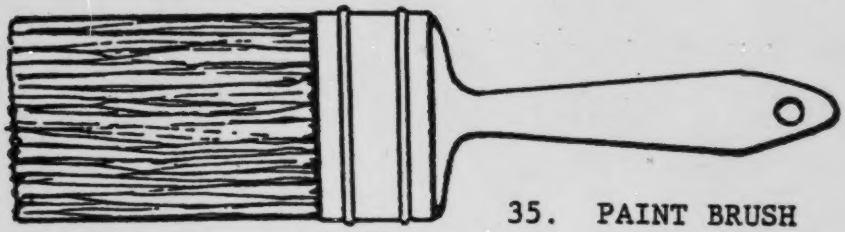
Keep sharp.

JOB STEPS



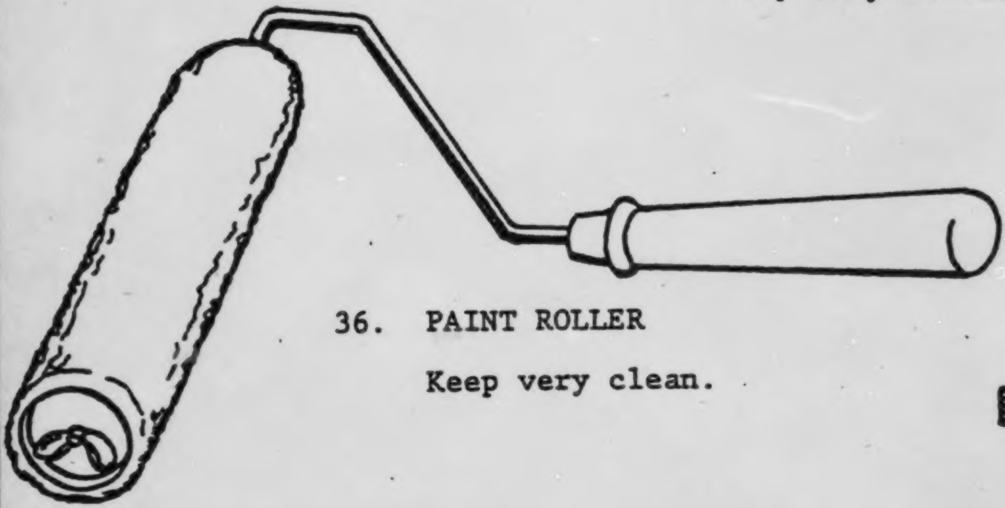
34. STAPLE GUN

Oil.



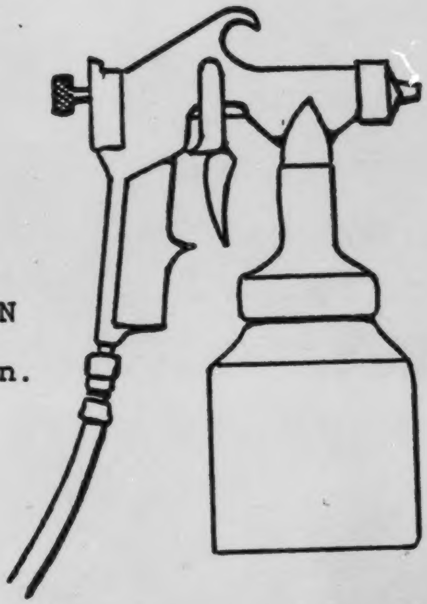
35. PAINT BRUSH

Keep very clean.



36. PAINT ROLLER

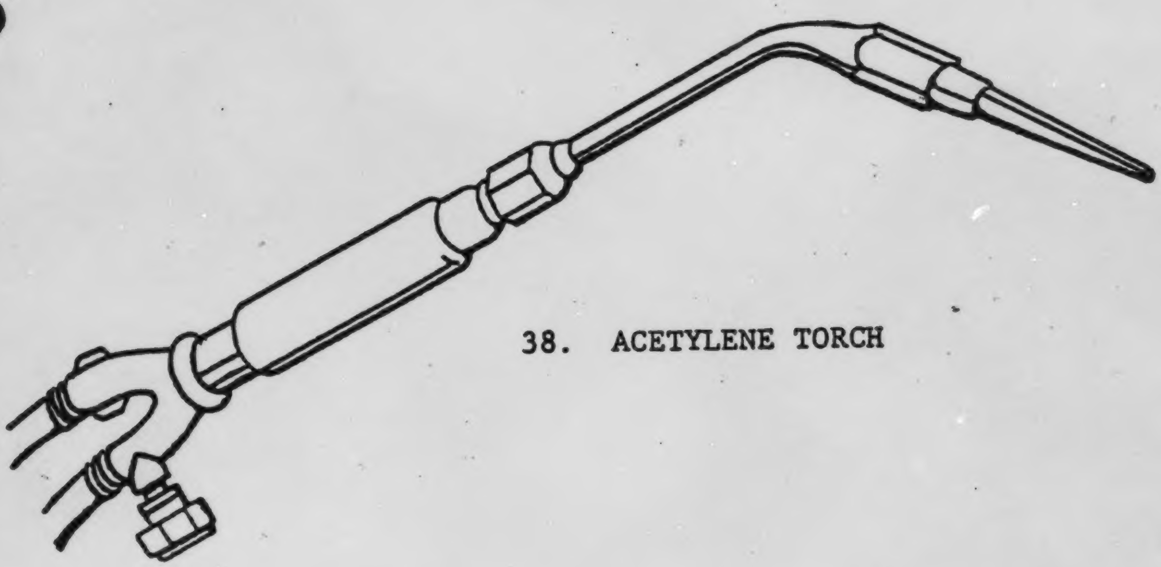
Keep very clean.



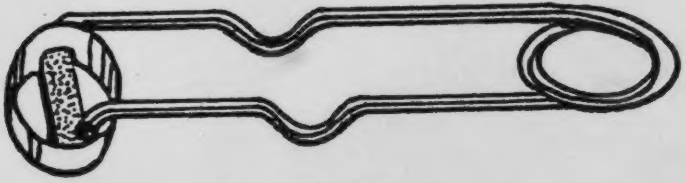
37. PAINT SPRAY GUN

Keep very clean.

JOB STEPS



38. ACETYLENE TORCH



39. STRIKER

building maintenance & engineering

unit: CABINET CONSTRUCTION

capital area career center

module: 2201 21 001 date: 2/77 level:

skill title: Working Diagram (Layout)

developed & written by: Mike Polen

visuals by: Glen Cooley

PERFORMANCE OBJECTIVE

You Are Going To Learn:

How to make a drawing (layout) of a cabinet.

And In Order To Do This You Will Need:

A pencil

Drawing paper

A ruler

We Will Know You Can Do It When:

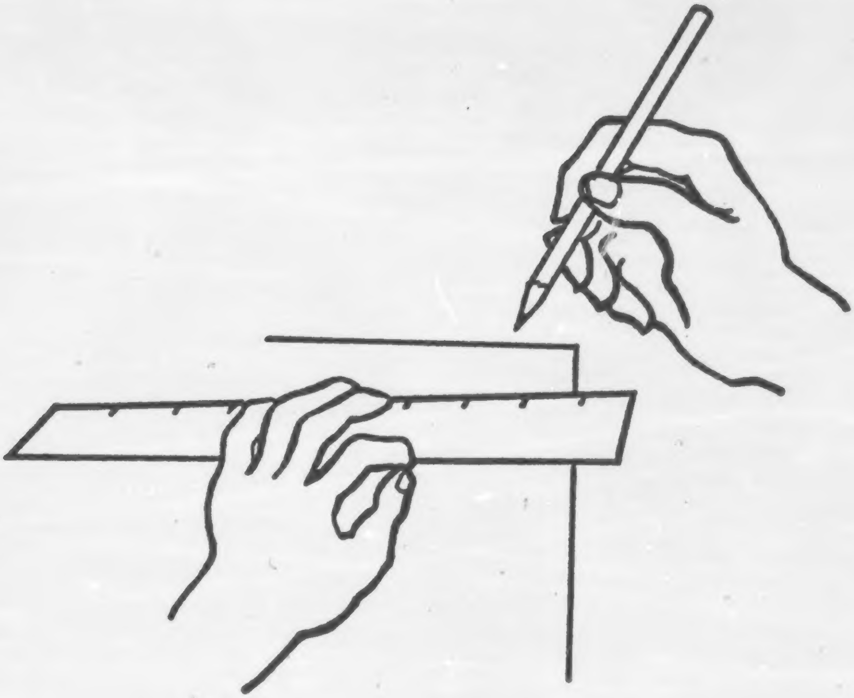
All measurements of length, width, and depth of the parts are shown, and by looking at the drawing you can cut all pieces to fit.

JOB STEPS

1. Make out a scale to size of the cabinet 1 Foot = 1 Inch. (Each inch on your drawing stands for one foot for your cabinet.)

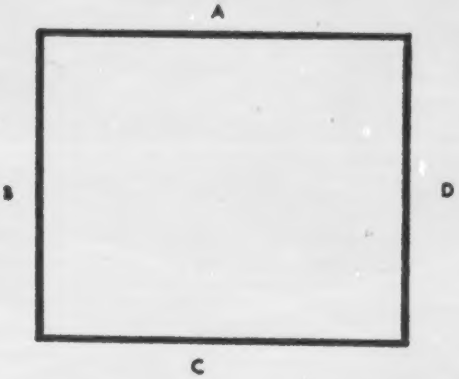
2. With the ruler, draw a straight line across the paper (see line A in diagram). Remember 2 inches is 2 feet and 3 inches is 3 feet.

3. With the ruler draw line B down toward the bottom of the paper.



JOB STEPS

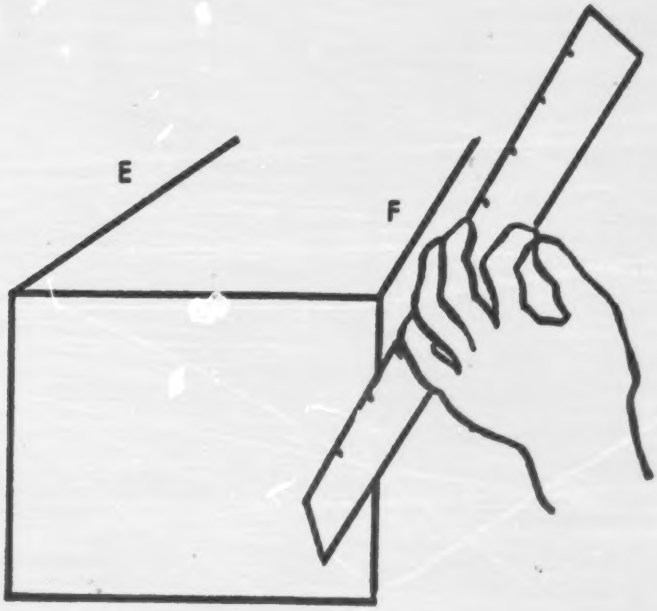
4. Then draw lines C and D.



CHECK:

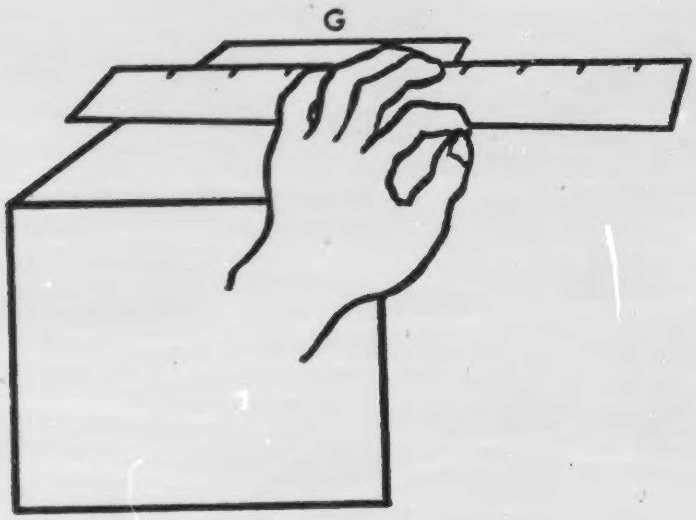
1. Lines A and C should be the same length.
2. Lines B and D should be the same length.

5. With the ruler, draw lines E and F.



JOB STEPS

6. Connect lines E and F with line G.

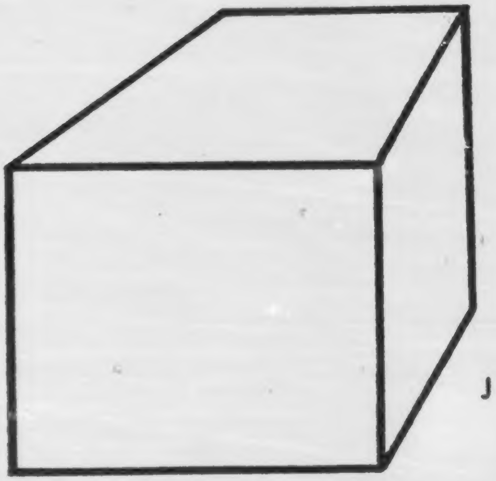


CHECK:

1. Lines E and F should be the same length.
2. Lines G and A should be the same length.

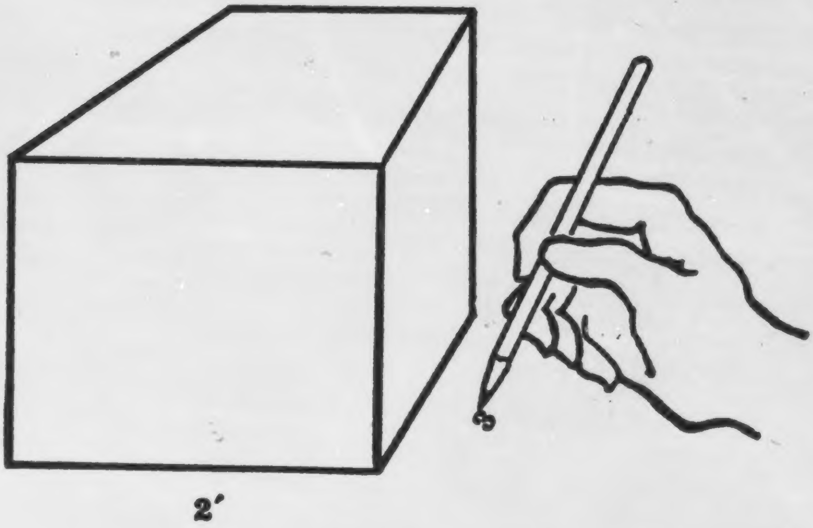
7. Draw line I the same length as line D.

8. Draw line J the same length as line F.



JOB STEPS

9. Put down in feet (not inches) the width, height, and depth of your cabinet.



10. Take your cabinet layout to your instructor.

building maintenance & engineering

unit: CABINET CONSTRUCTION

capital area career center

module: 2201 21 002 date: 2/77 level:

skill title: Cutting Parts for Fabrication

developed & written by: Mike Polen

visuals by: Chuck Knock

PERFORMANCE OBJECTIVE

You are going to learn:

How to cut (saw) parts of the cabinet from a sheet of plywood.

And in order to do this you will need:

Sheet of plywood

Steel tape measure

Table or circular saw

Layout

Pencil

We will know you can do it when:

You have measured and cut all the parts of the cabinet so that they can be put together.

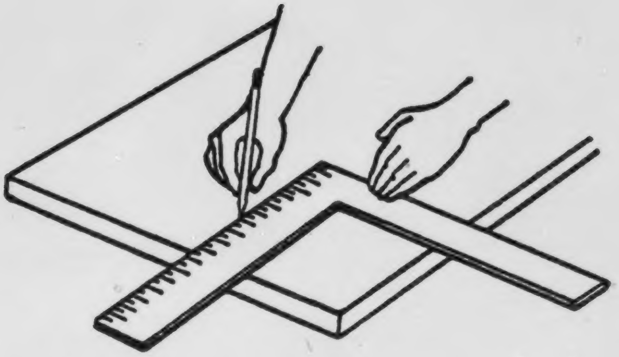
INFORMATION	MATERIALS	LOCATION OF MATERIALS
Before cutting parts for your cabinet, be sure you have studied: Module 2201 20 004 Operation of table saw. Module 2201 20 005 Operation of circular saw. You must have completed the goals for these modules before you can cut the parts for your cabinet.		

JOB STEPS

CAUTION:

1. Be sure saw guard is in place.
2. Area on floor is free from cut off materials for good footing.
3. A push stick is handy when needed.
4. Know what you are going to do before you start cutting.

1. Using your layout, measure and line with a pencil all parts of you cabinet.



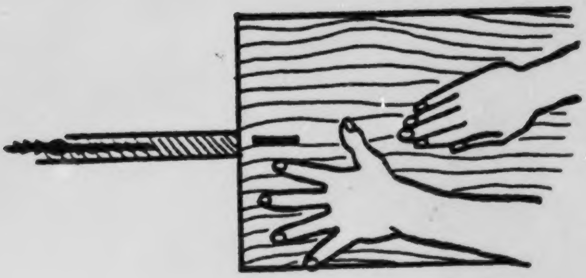
2. Set up saw as you did in module 2201 20 004 or 2201 10 005.

WORD GUIDE

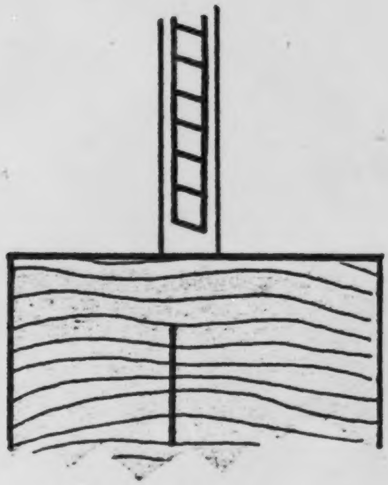
RIP CUTS - Cutting with the grain.

JOB STEPS

3. Make all rip cuts first. Be sure you do not cut out pencil marks.



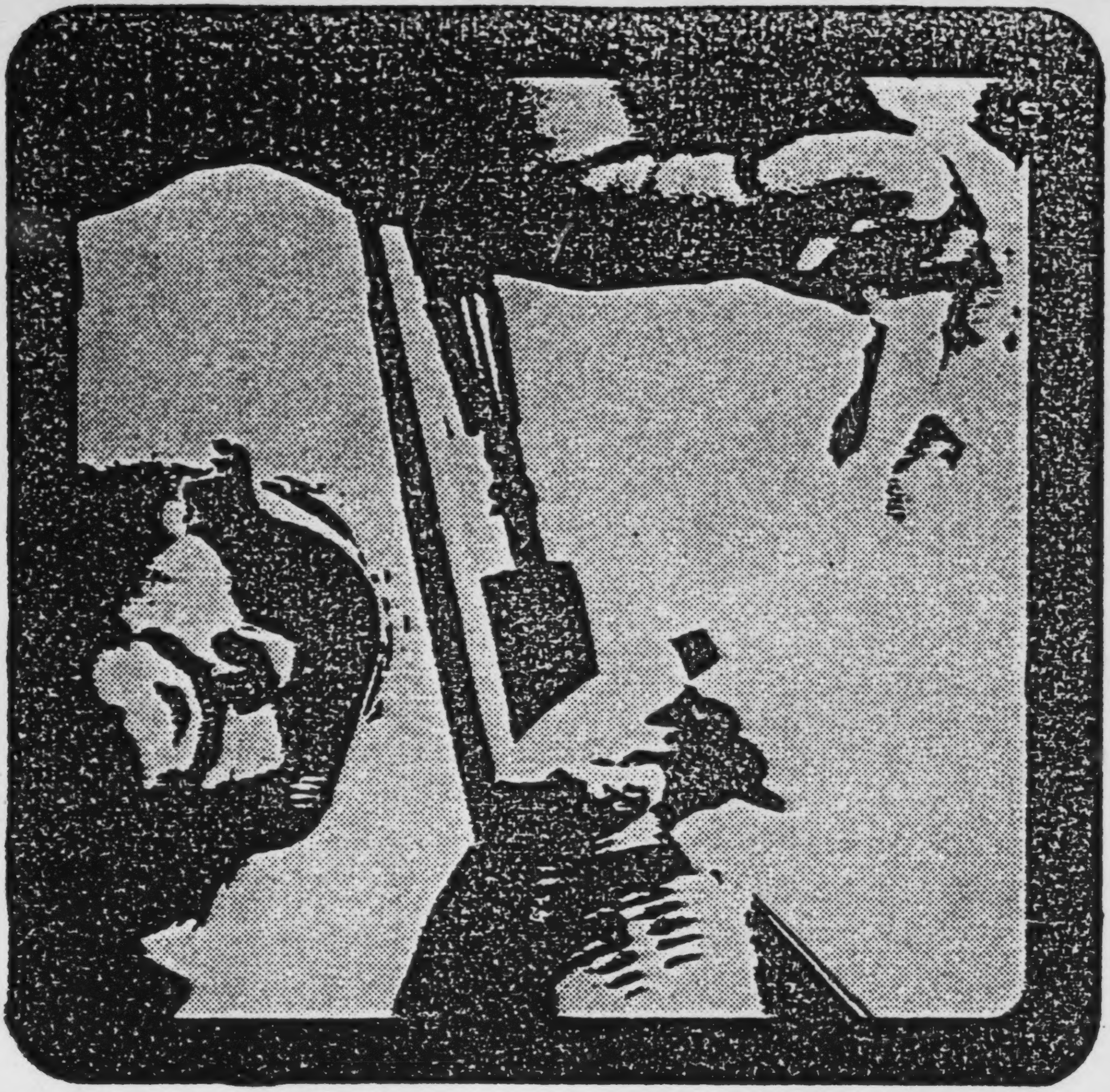
4. Then make cross cuts across grain and again be sure you do not cut out pencil marks.



JOB STEPS

5. Unplug saw and check measurements.

6. Show your instructor your cut pieces.



building maintenance & engineering

unit: Cabinet Construction

capital area career center

module: 2201 21 003 date: 2/77 level: 1

skill title: Construct a Cabinet

developed & written by: Mike Polen

visuals by: Bill Draper

WORD GUIDE

SQUARE - Straight and even.

ASSEMBLE - Put together.

PERFORMANCE OBJECTIVE

You Are Going To Learn:

How to assemble the cabinet parts into a complete cabinet.

And In Order To Do This You Will Need:

- hammer
- screwdriver
- carpenter's square
- electric hand drill
- screwmate tool
- screws
- nails and glue
- layout drawing
- parts

We Will Know You Can Do It When:

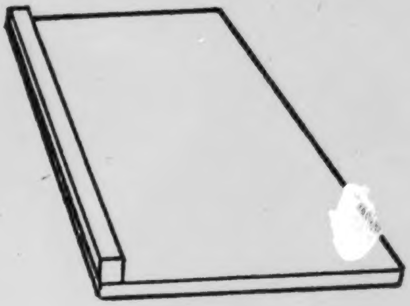
You have fastened together all the cabinet parts so that the cabinet is square and the joints are solid.

WORD GUIDE

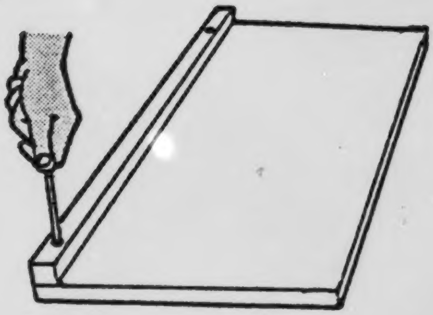
FLUSH - Even and straight at edges and joints.

JOB STEPS

1. Place a 3/4 inch square piece of wood on the top edge of both side pieces. Must be flush on top. Be sure the 3/4 inch pieces are no deeper than the side pieces.

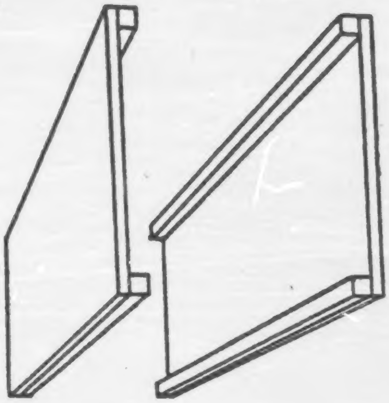


2. Glue one side of the 3/4 inch pieces and screw them to the side pieces.

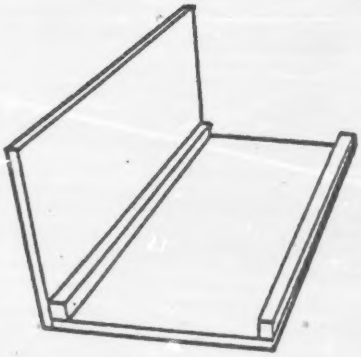


JOB STEPS

3. Do the same with 2 more 3/4 inch square pieces on the bottom edge of the side pieces.



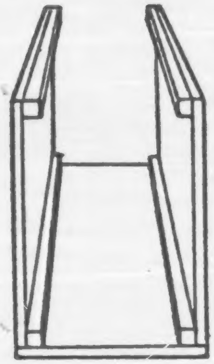
4. Place the top piece on a table and put one side piece on the edge of the top piece. Be sure edges are flush.



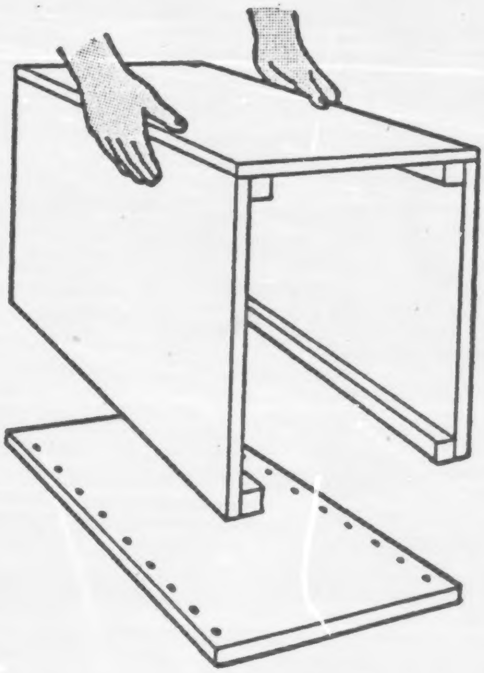
JOB STEPS

5. Glue and screw the top and side pieces together on the 3/4 inch piece.

6. Do the same with the other side piece.

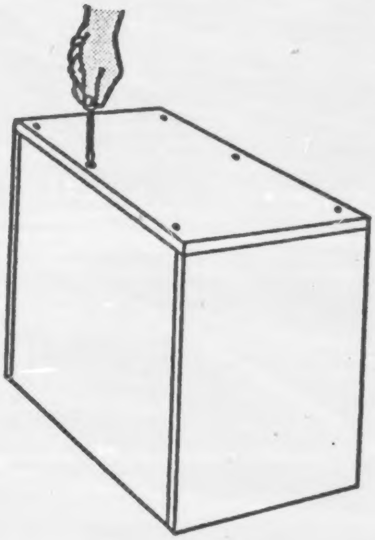


7. Place the bottom shelf piece on the table, and set the top and side pieces on it.

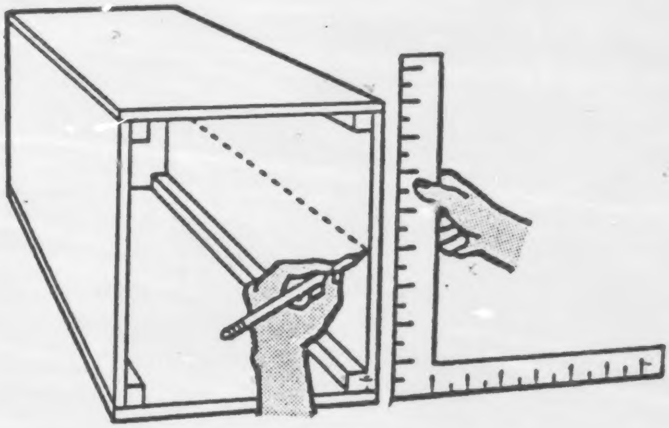


JOB STEPS

8. Glue and screw the bottom piece to the 3/4 inch pieces on each side.

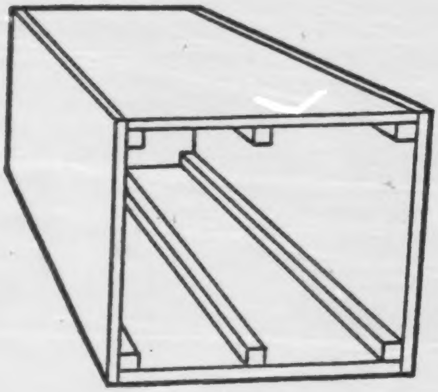


9. Measure half-way up the sides and draw a line across the inside of each side piece.

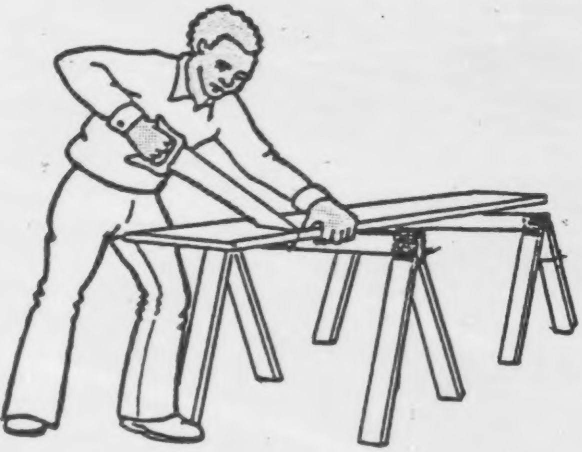


JOB STEPS

10. Glue and screw a 3/4 inch square piece just below the line you have drawn.



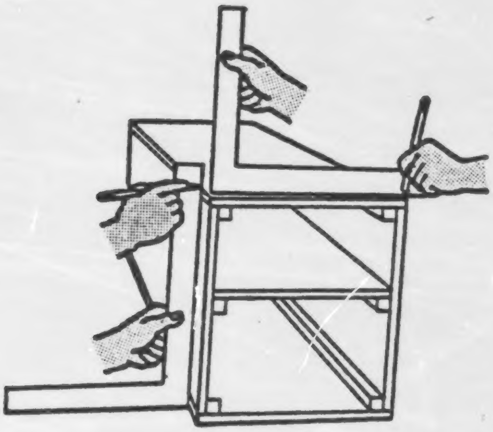
11. Measure the distance between your two sides (from the inside), and cut your middle shelf.



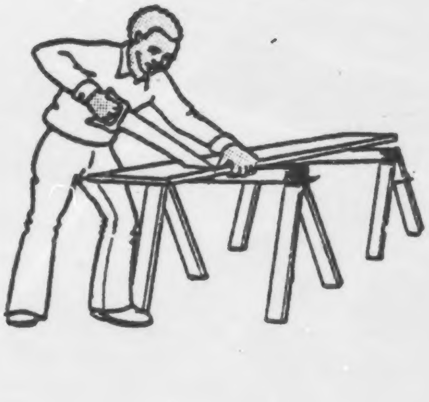
JOB STEPS

12. Put middle shelf on the 3/4 inch side pieces. Glue and screw together.

13. Measure the back of your cabinet, from the outside edges. Write down the height and width.

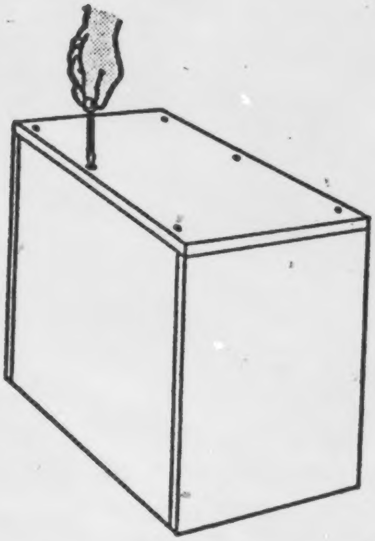


14. Cut your back side.



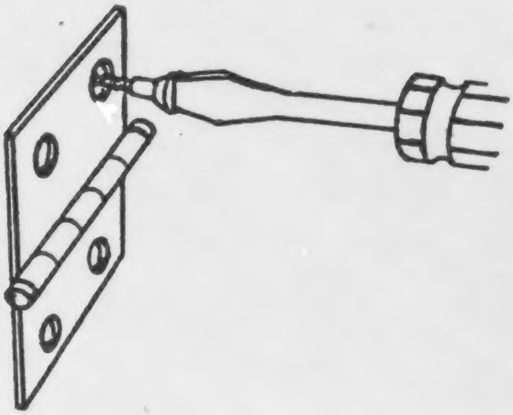
JOB STEPS

15. Place cabinet front-down on floor and put back side on top of it. Screw back onto cabinets by putting screws into end of each 3/4 inch square pieces.



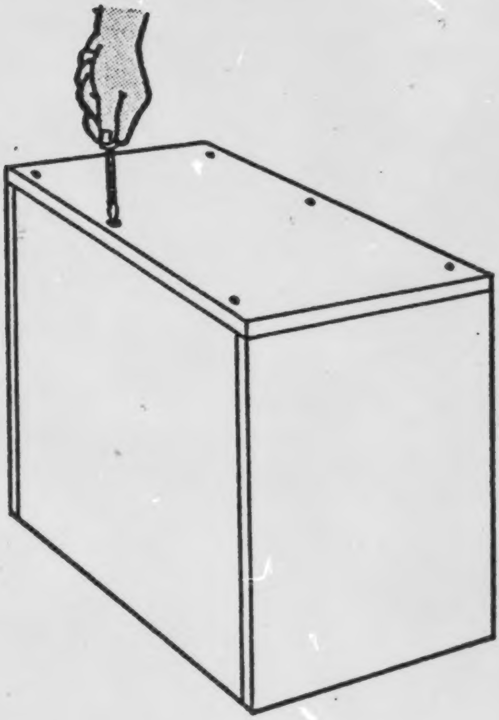
16. Ask your instructor if you are ready to put door on.

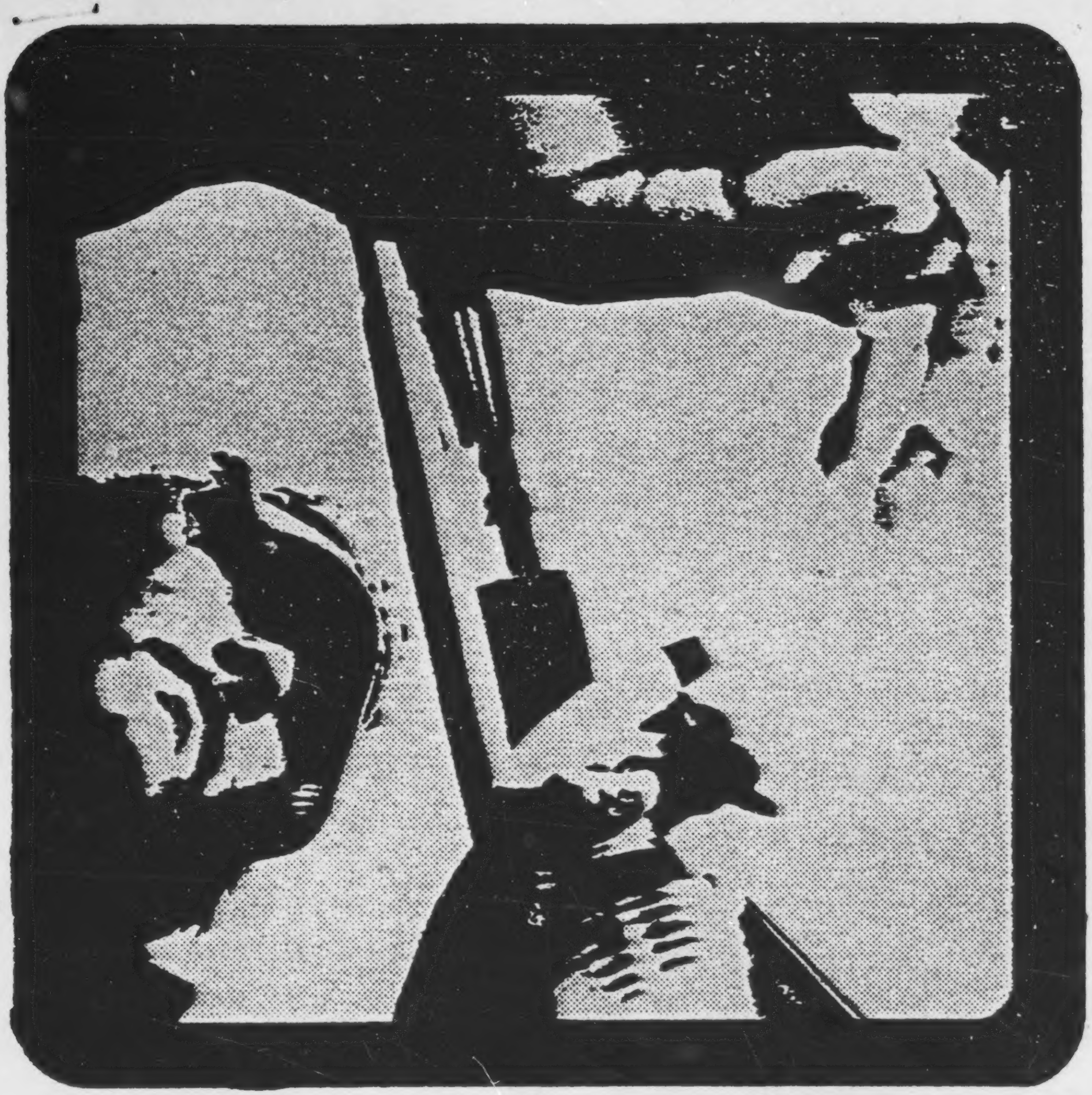
17. Screw hinges into side piece. Be sure to hold the door piece flush against cabinet as you attach hinges.



JOB STEPS

18. Check to make sure all screws are tightened down.





building maintenance & engineering

unit: Construct Cabinets

capital area career center

module: 2201 21 004 date: 2/77 level:

skill title: Fabricate Doors - Inset

developed & written by: Mike Polen

visuals by: Chuck Knock

PERFORMANCE OBJECTIVE

You Are Going To Learn:

How to fabricate inset doors for cabinets.

And In Order To Do This You Will Need:

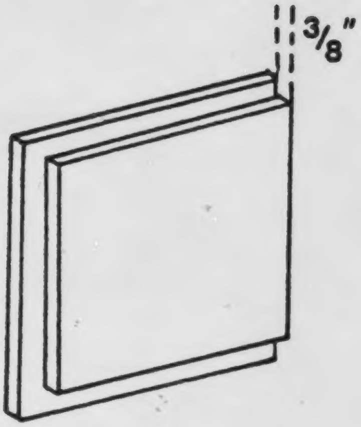
- saw
- steel tape
- hinges
- bit
- screws
- screwdriver
- router

We Will Know You Can Do It When:

You have cut a door to fit a cabinet opening and have installed the hinges. The door opens and closes without sticking.

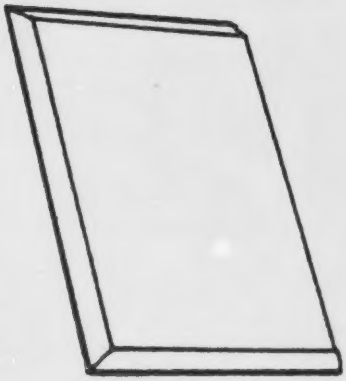
JOB STEPS

4. Route out 3/8 inch deep and 3/8 inch wide on the top, bottom, and hinge side of both doors. This allows for the offset hinge to fit.

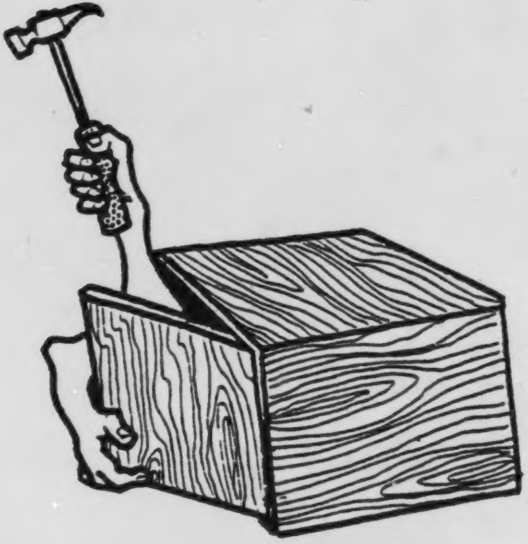


5. Try doors in opening before attaching hinges. Sand or trim to fit.

6. Use router to trim the edges; top, bottom and one side.



JOB STEPS



DOUBLE DOOR (FOR INSET DOORS 3/4 INCH)

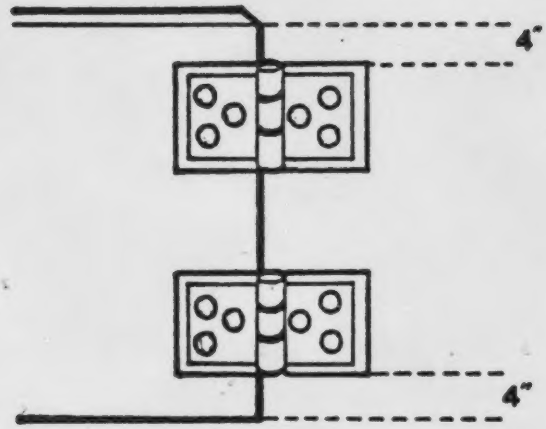
1. Measure door to be cut. Door height must be 3/4 inch (2 times 3/8 inch = 3/4 inch) longer than opening of cabinet.

2. Measure door width. Must be 3/8 inch wider than half (1/2) the total width of cabinet opening.

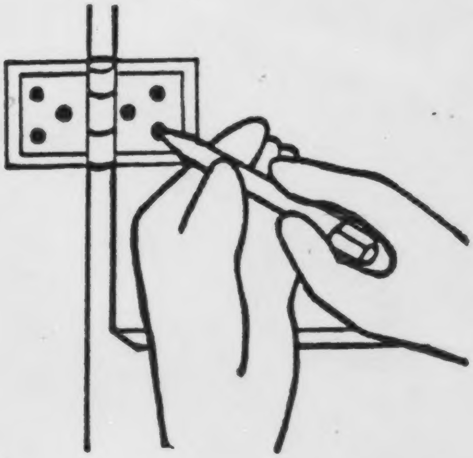
3. Cut two door pieces with the above measurements.

JOB STEPS

7. Attach hinges 4 inches down from top and 4 inches up from bottom.



8. Center punch screw holes and insert screws in trim and door.



9. Adjust to open and close without sticking.

10. Install magnetic door latches. See instructor.

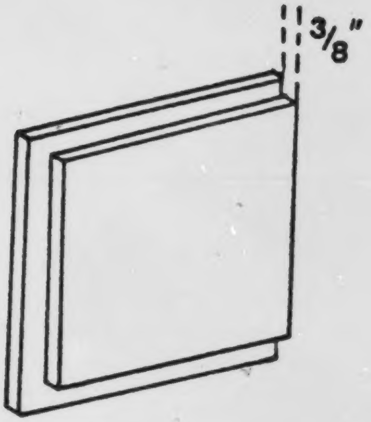
JOB STEPS

SINGLE DOOR

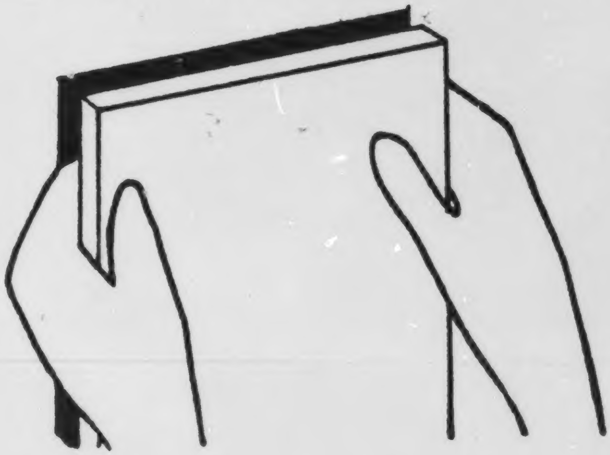
1. Measure door to be cut. Door height must be 3/4 inch (2 times 3/8 inch = 3/4 inch) longer than opening of cabinet.

2. If you are making one door to cover opening, the door must be 3/4 inch higher and wider than cabinet opening.

3. Route out 3/8 inch deep and wide on the top, bottom, and sides of the door.

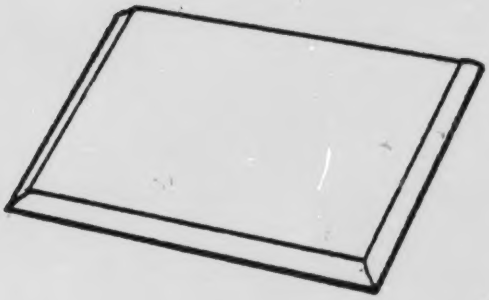


4. Try door in opening before attaching hinges. Sand and trim to fit.

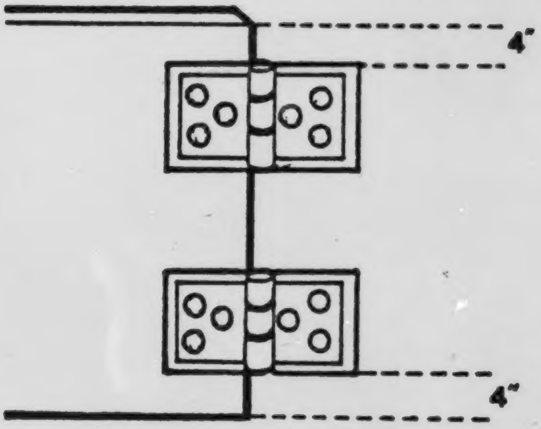


JOB STEPS

5. Use router to trim the edges; top, bottom and both sides.

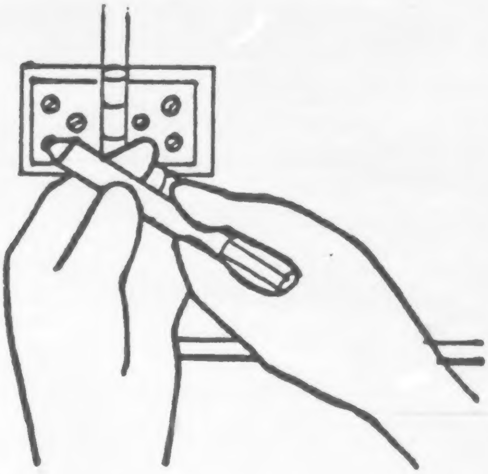


6. Attach hinges 4 inches down from top and 4 inches up from bottom.



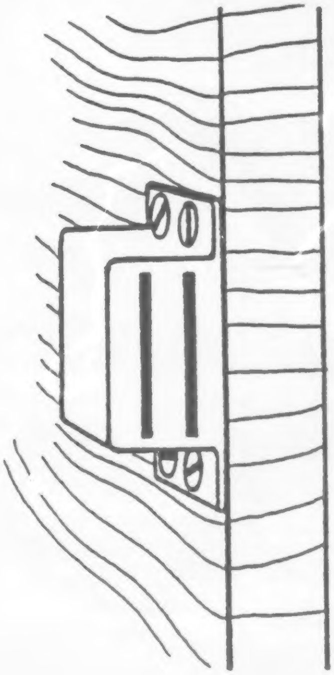
JOB STEPS

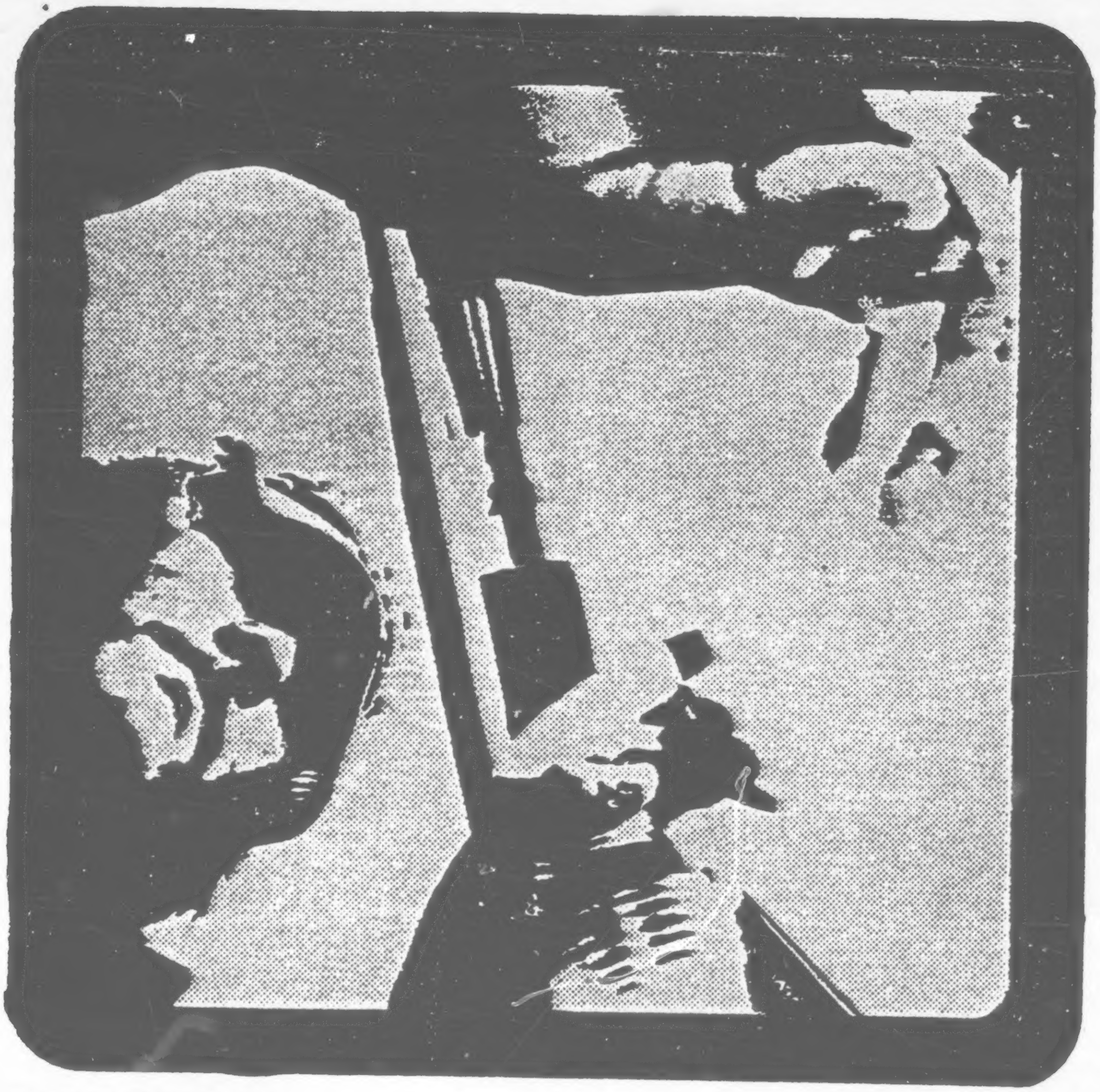
7. Center punch screw holes and insert screws in trim and door.



8. Adjust to open and close without sticking.

9. Install magnetic door latches. See instructor.





building maintenance & engineering

unit: Construct Cabinets

capital area career center

module: 2201 21 005 date: 2/77 level: II

skill title: Fabricate Doors - Flush

developed & written by: Mike Polen

visuals by: Glen Cooley

PERFORMANCE OBJECTIVE

YOU ARE GOING TO LEARN:

How to make and put together flush doors for cabinets.

AND IN ORDER TO DO THIS YOU WILL NEED:

Saw

Steel tape

Hinges

Screws

Screwdriver

WE WILL KNOW YOU CAN DO IT WHEN:

The door you have cut fits the cabinet opening, and you have installed the hinges so that the door opens and closes without sticking.

WORD GUIDE

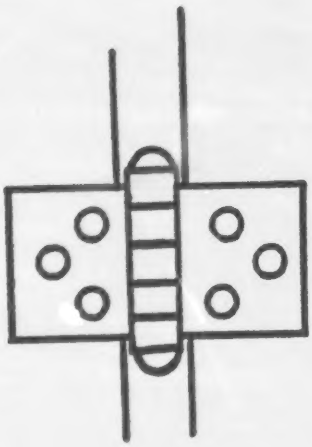
FLUSH FIT - Outside of door is even with the trim.

JOB STEPS

1. For a flush fitting door, cut plywood to the size of the opening. Make width 1/16 inch narrower for clearing.

2. Try door in opening. Sand down if needed to set an even fit.

3. Place hinges on door so the hinge pin is in the middle of the slot between door and trim.

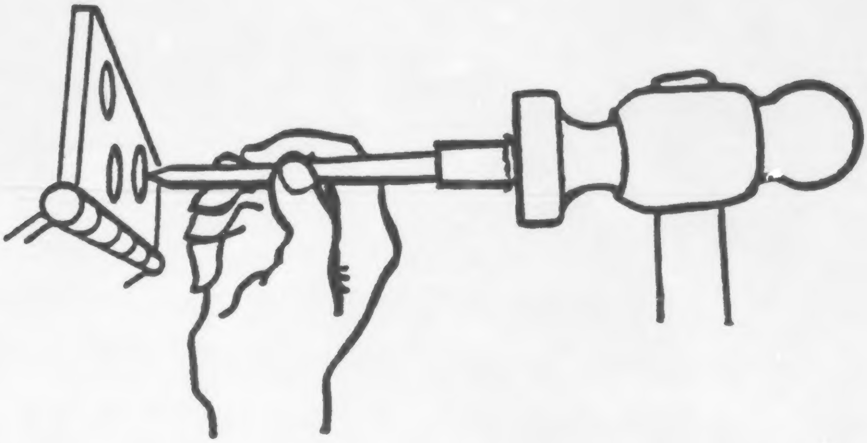


WORD GUIDE

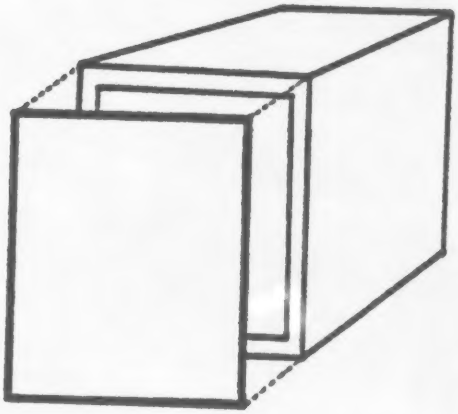
CENTER PUNCH - Making a pointed hole to make drill bit start in center of hinge hole.

JOB STEPS

4. Center punch screw holes and put in screws in door 4 inches down from top and 4 inches up from bottom.



5. Place door in opening and center it between top and bottom.



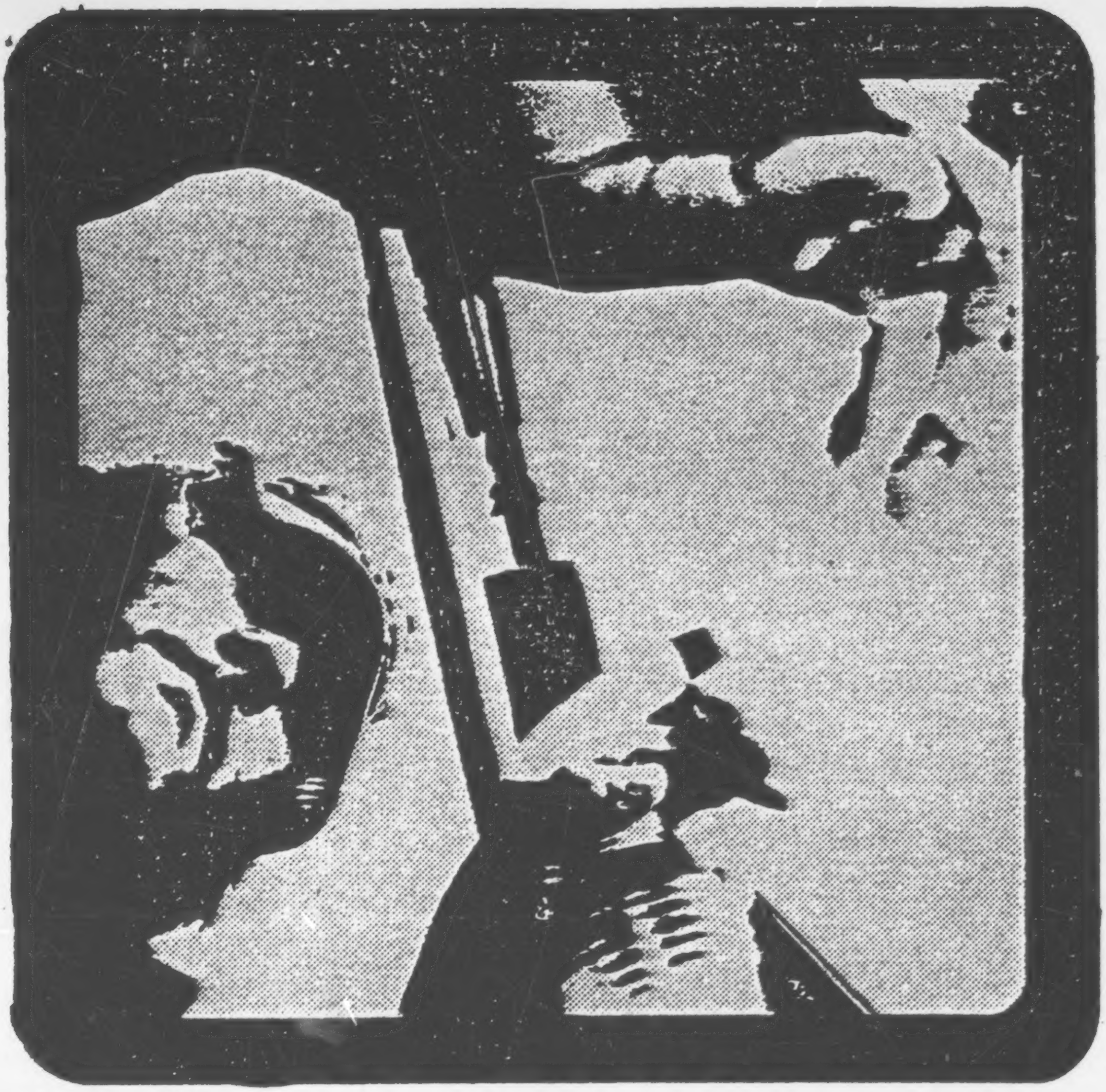
JOB STEPS

6. Center punch screw holes in cabinet and put in screws.

7. When door is in place bring it to closed position. If it is too tight, sand the inside edge until it closes easily.

8. For double doors, do the same job steps for each door.

9. Put away all materials.



building maintenance & engineering

unit: Construct Cabinets

capital area career center

module: 2201 21 006 date: 2/77 level: II

skill title: Fabricate Drawers

developed & written by: Mike Polen

visuals by: Marie Gougeon

PERFORMANCE OBJECTIVE

You are going to learn:

How to make drawers for a cabinet.

And in order to do this you will need:

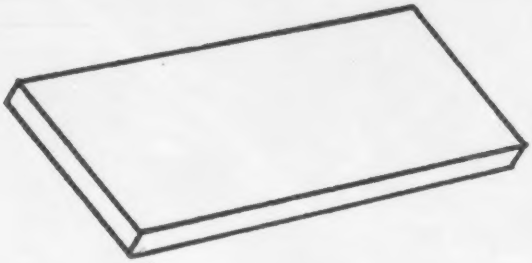
- saw
- carpenter's square
- steel tape
- plywood
- glue
- screws
- nails
- screwdriver

We will know you can do it when:

The drawer you have made is square, and it slides into the cabinet opening without sticking.

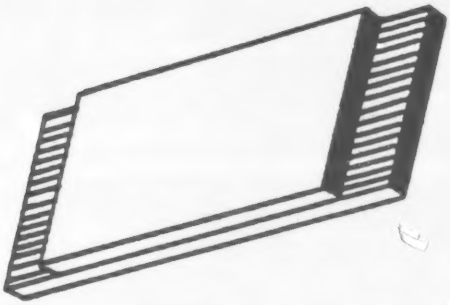
JOB STEPS

1. Cut a 3/4 inch piece of plywood 1/2 inch wider and 1/2 inch higher than drawer opening.



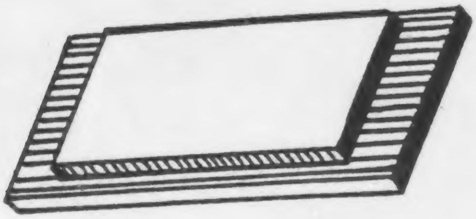
2. Cut out drawer sides and back to fit drawer opening and length. Use 5/8 inch plywood.

3. Rout out 5/8 inch wide, 3/8 inch deep on both sides of drawer face.

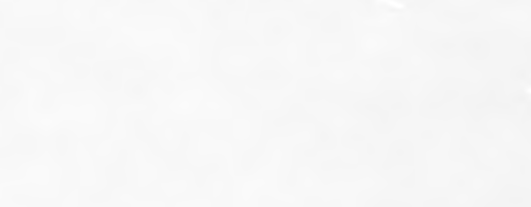


JOB STEPS

4. Rout out 1/4 inch top and bottom of drawer face - 3/8 inch deep.



5. Cut a 1/4 inch deep groove 1/2 inch up from bottom on sides back, 3/4 inch up on face.

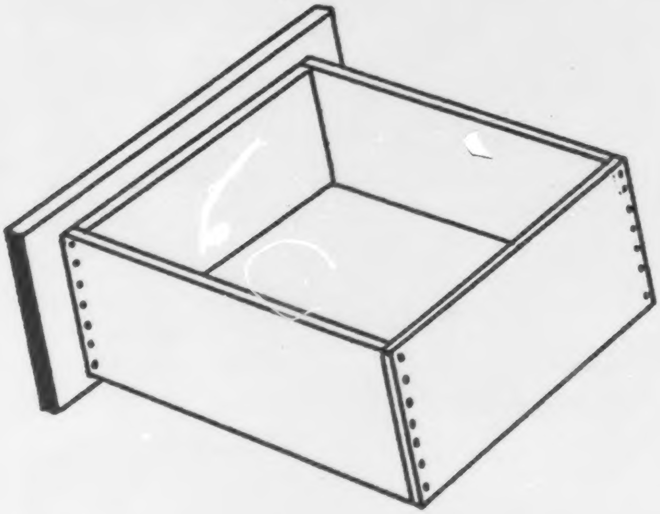


JOB STEPS

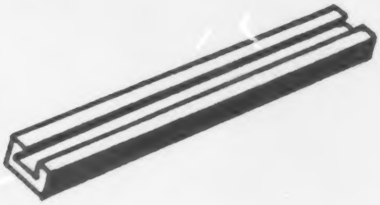
6. Glue and nail sides to face.

7. Cut bottom 1/4 inch material to fit drawer size. Allow for depth of groove on all sides. Slide into place.

8. Put back in place and glue and nail.

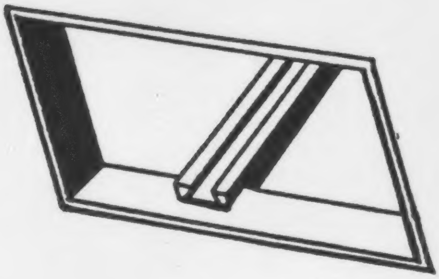


9. Cut drawer guide angle cut 30°, 1/2 inch thick. Length should include notch in cabinet trim.



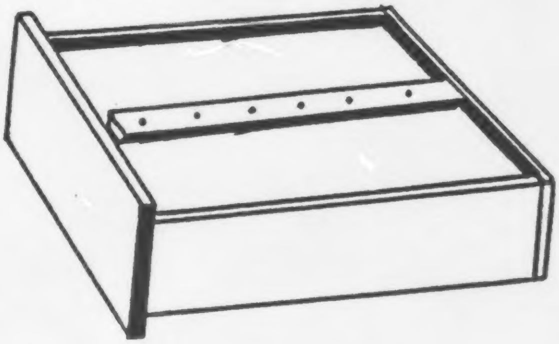
JOB STEPS

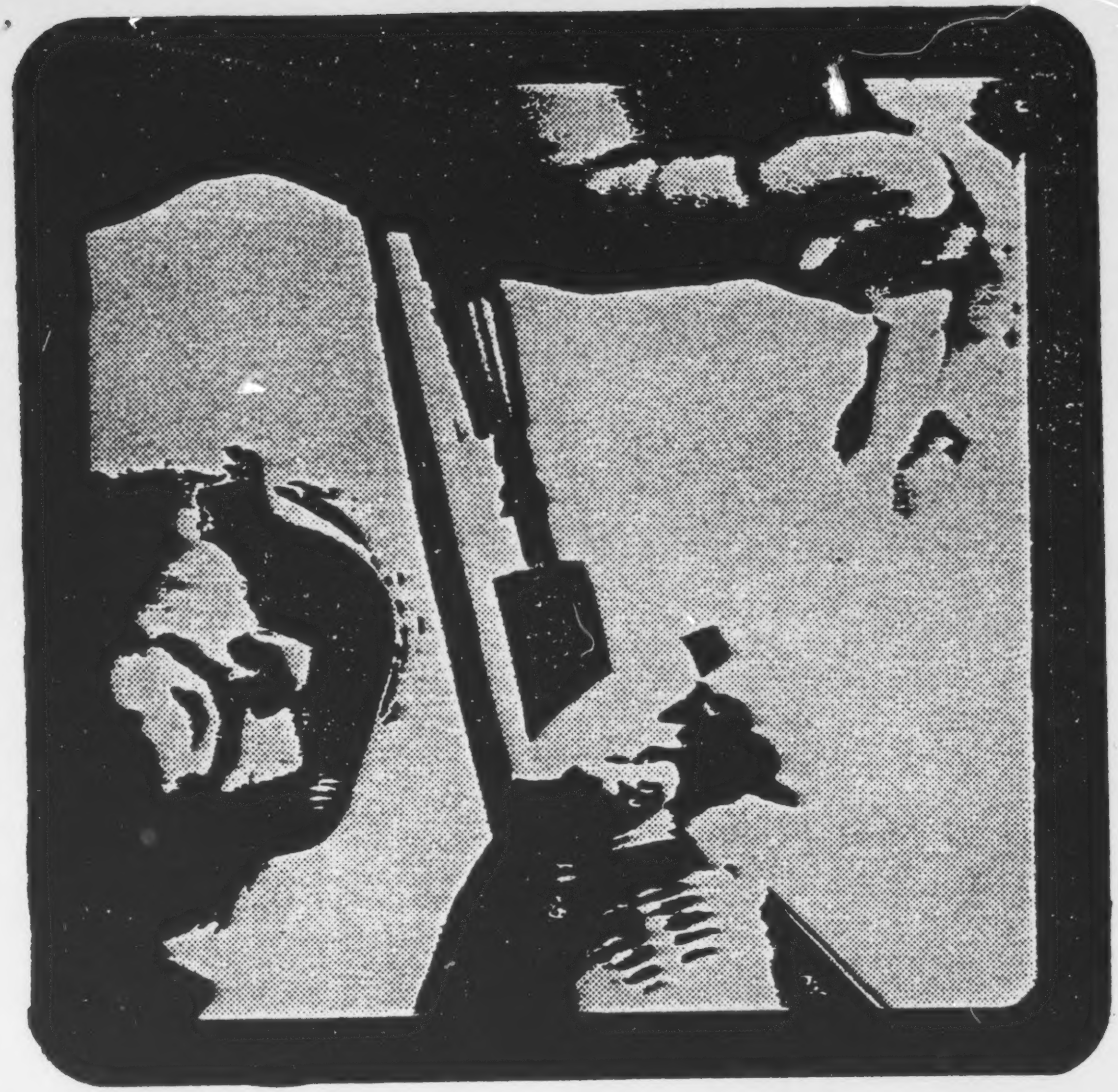
10. Fit between trim and back of cabinet; glue and nail.



11. Cut guide strip 30° angle 1/2 inch thick, fasten to bottom of drawer and in line with guide track. Glue and screw.

NOTE: BOTTOM OF GROOVE ON TRACK SHOULD BE LEVEL WITH TOP OF TRIM.





building maintenance & engineering

unit: Construct Cabinets

capital area career center

module: 2201 21 007 date: 2/77 level: II

skill title: Cabinet Finishing

developed & written by: Mike Polen

visuals by: Glen Cooley

WORD GUIDE

FINISH - To sand and paint or varnish.

PERFORMANCE OBJECTIVE

You Are Going To Learn:

How to finish a cabinet.

And In Order To Do This You Will Need:

- power sander
- fine & medium grit sandpaper
- sanding block
- clean rag
- filler
- putty knife
- stain or urethane
- paint thinner

We Will Know You Can Do It When:

The cabinet surface you have finished is smooth with no marks or scratches.

WORD GUIDE

COUNTERSINK - Push on screw below surface of the wood.

JOB STEPS

1. Countersink all screws and nails to 1/16 inch below the wood surface.
2. Fill all nail and screw holes and deep scratches with plastic wood filler level with surface.
3. Let dry.
4. Use power sander with medium grit sandpaper and sand all the surface.
5. Check surface for any scratches or rough spots missed. Repeat job step 4 if needed.
6. Brush off all sanding dust.
7. Change to fine grit sandpaper and sand entire surface again.
8. Blow off the dust from the surface with an air hose.
9. Move cabinet to the paint area. Dampen a clean rag with paint thinner and wring out the excess.
10. Wipe entire surface to remove fine dust.

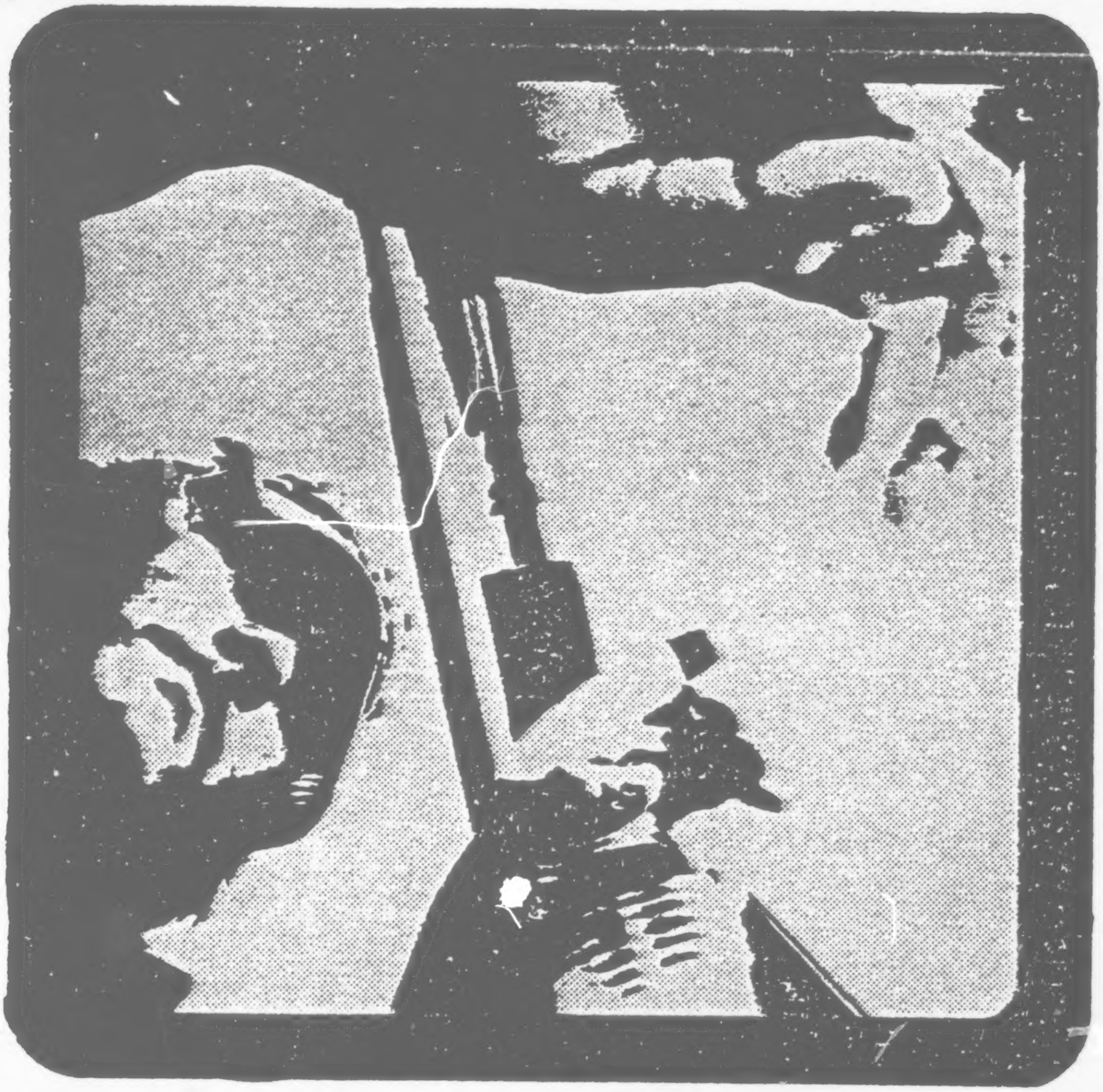
JOB STEPS

11. For a natural finish, go to step 12. For other than a natural finish apply a stain evenly over entire surface and let dry (read directions on container).

12. Apply first coat of urethane and let dry (see directions on container).

13. If finish is rough, rub the surface lightly with fine steel wool.

14. Apply last coat of urethane.



building maintenance & engineering

unit: Repair Damaged Furniture

capital area career center

module: 2201 22 001 **date:** 2/77 **level:** II

skill title: Repair Stripped Screw Holes

developed & written by: Roy Haske

visuals by: Chuck Knock

WORD GUIDE

UNDER-SIZED DRILL BIT - Smaller bit than the screw you will use.

PERFORMANCE OBJECTIVE

You Are Going To Learn:

How to repair enlarged (stripped) screw holes.

And In Order To Do This You Will Need:

glue

pieces of soft wood

hammer

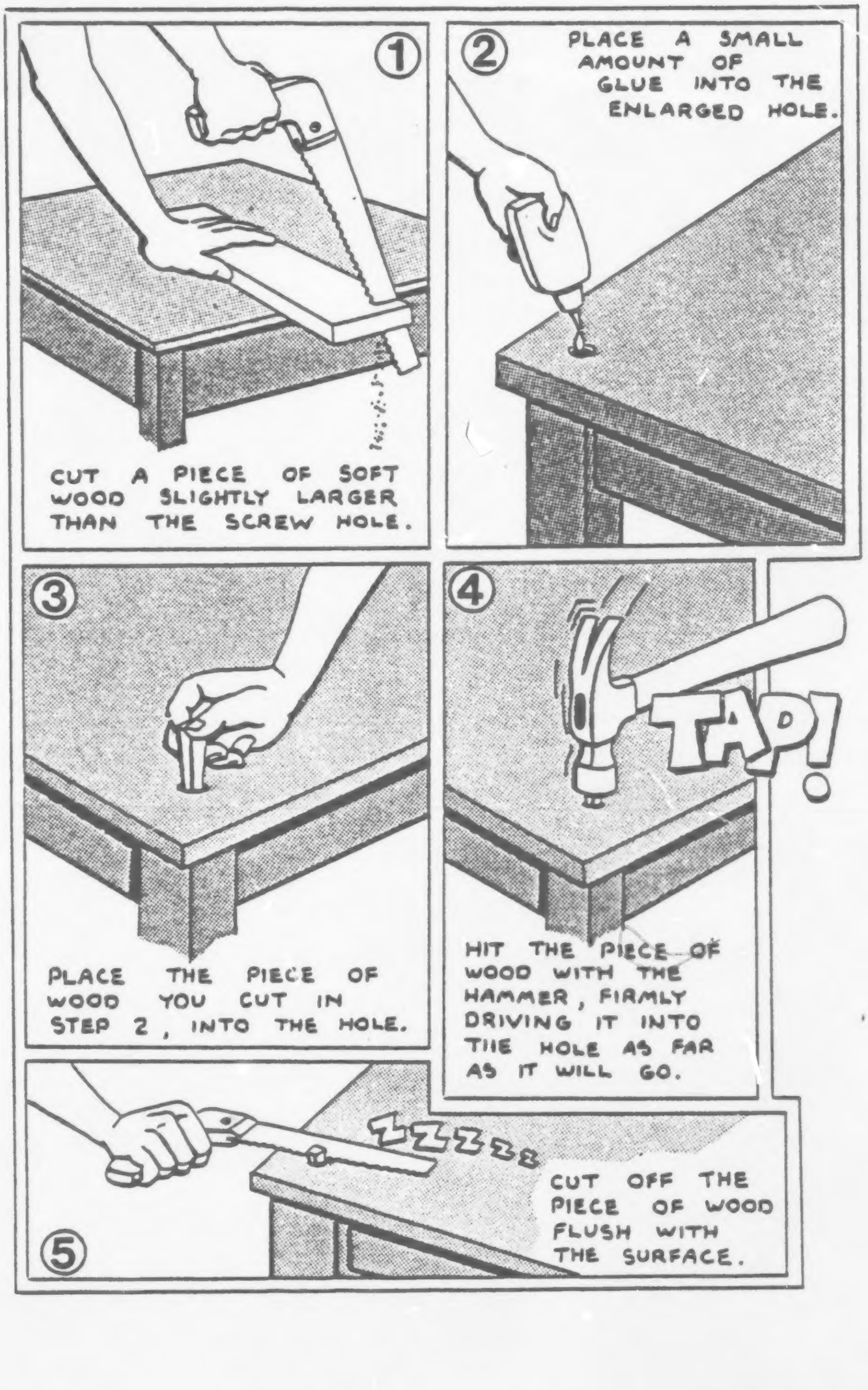
drill

under-sized drill bit

We Will Know You Can Do It When:

You have tightly plugged the hole, drilled a new hole in the same place and tightened the screw into the hole.

JOB STEPS



① CUT A PIECE OF SOFT WOOD SLIGHTLY LARGER THAN THE SCREW HOLE.

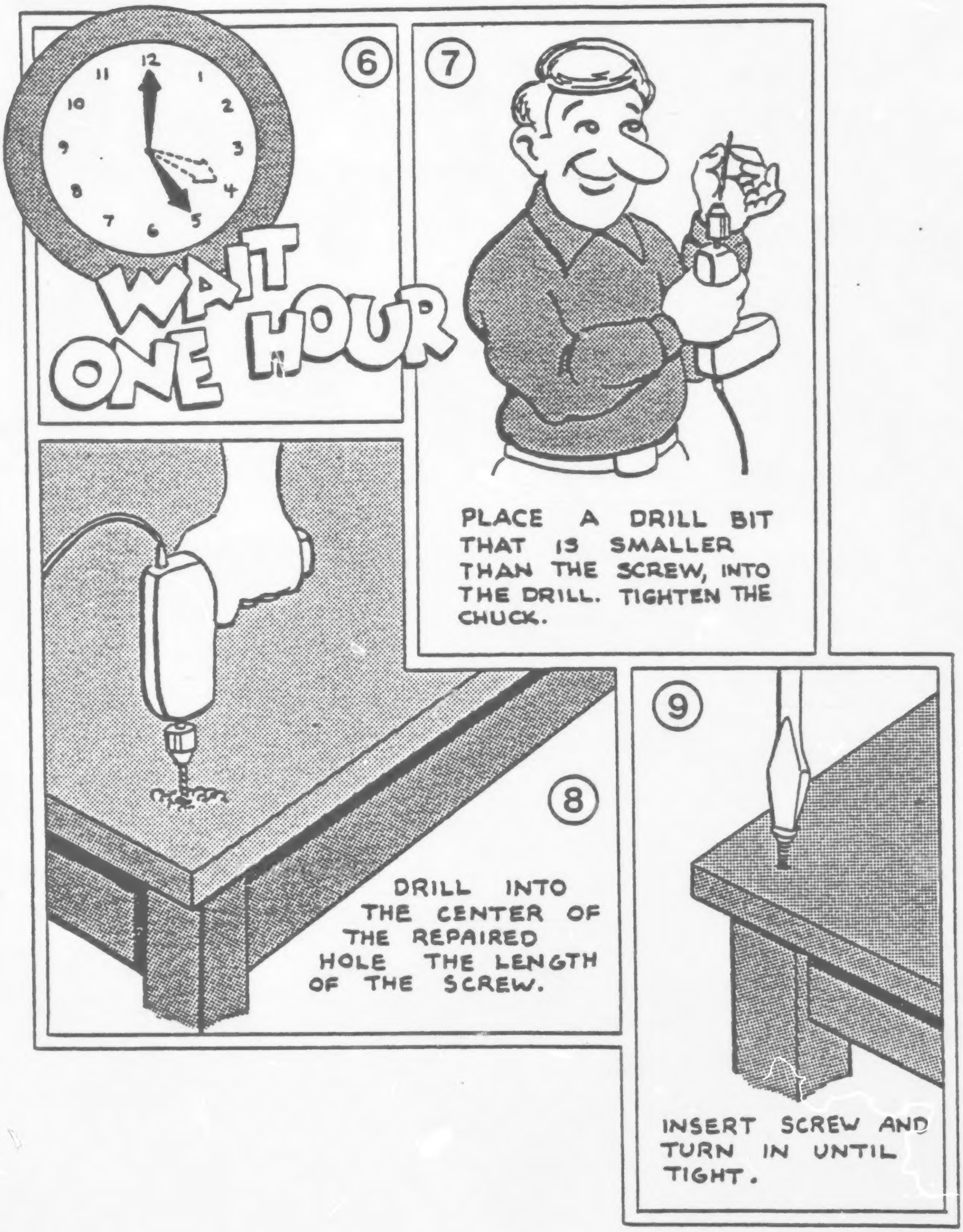
② PLACE A SMALL AMOUNT OF GLUE INTO THE ENLARGED HOLE.

③ PLACE THE PIECE OF WOOD YOU CUT IN STEP 2, INTO THE HOLE.

④ HIT THE PIECE OF WOOD WITH THE HAMMER, FIRMLY DRIVING IT INTO THE HOLE AS FAR AS IT WILL GO.

⑤ CUT OFF THE PIECE OF WOOD FLUSH WITH THE SURFACE.

JOB STEPS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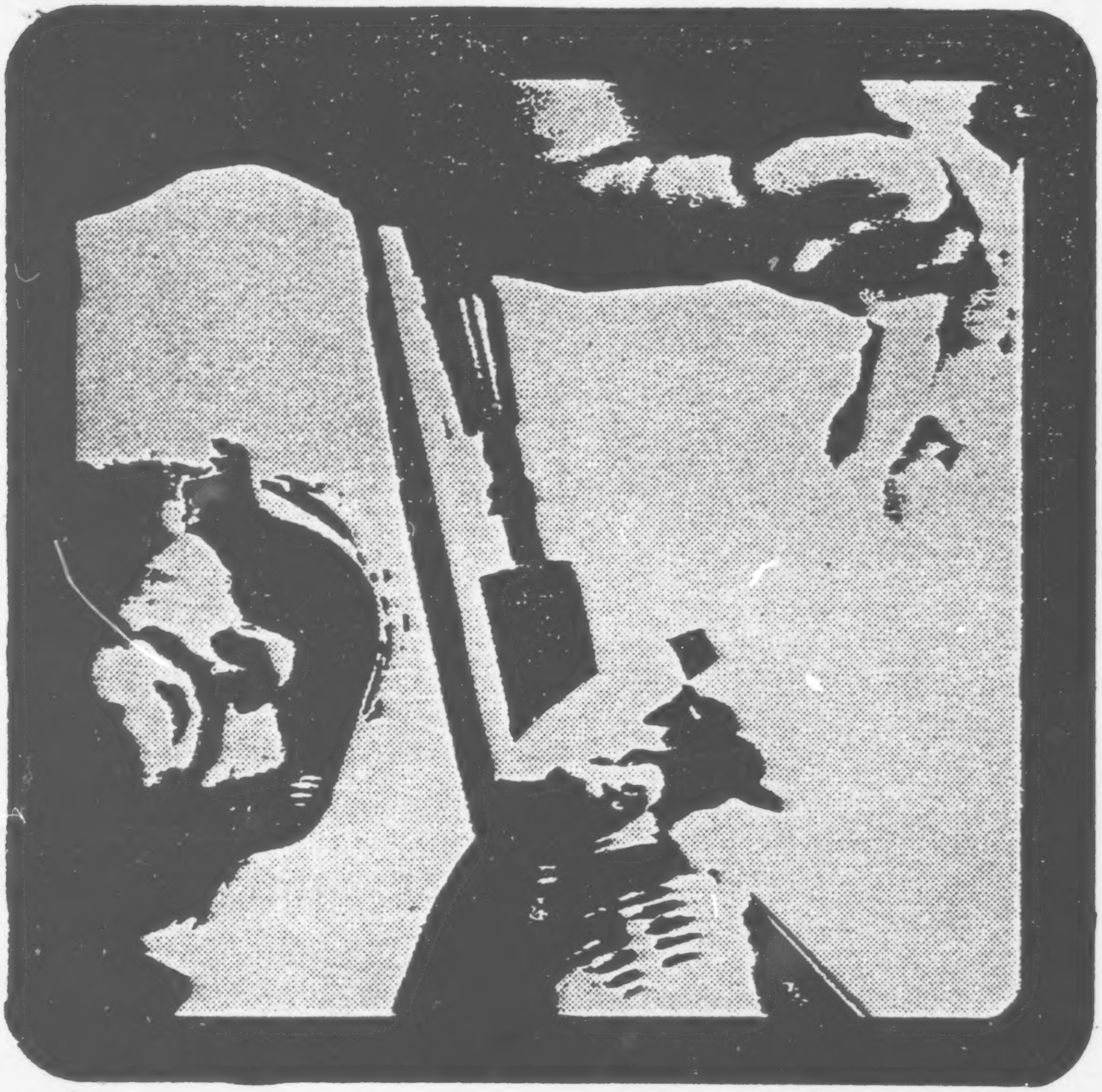
11
WAIT ONE HOUR

⑥ WAIT ONE HOUR

⑦ PLACE A DRILL BIT THAT IS SMALLER THAN THE SCREW, INTO THE DRILL. TIGHTEN THE CHUCK.

⑧ DRILL INTO THE CENTER OF THE REPAIRED HOLE THE LENGTH OF THE SCREW.

⑨ INSERT SCREW AND TURN IN UNTIL TIGHT.



building maintenance & engineering

unit: Repair Damaged Furniture

capital area career center

module: 2201 22 002 **date:** 2/77 **level:** II

skill title: Repair Wood Cracks

developed & written by: Roy Haske

visuals by: Chuck Knock

WORD GUIDE

WHITE GLUE - A glue that dries clear.

PERFORMANCE OBJECTIVE

You Are Going To Learn:

How to repair furniture that is cracked.

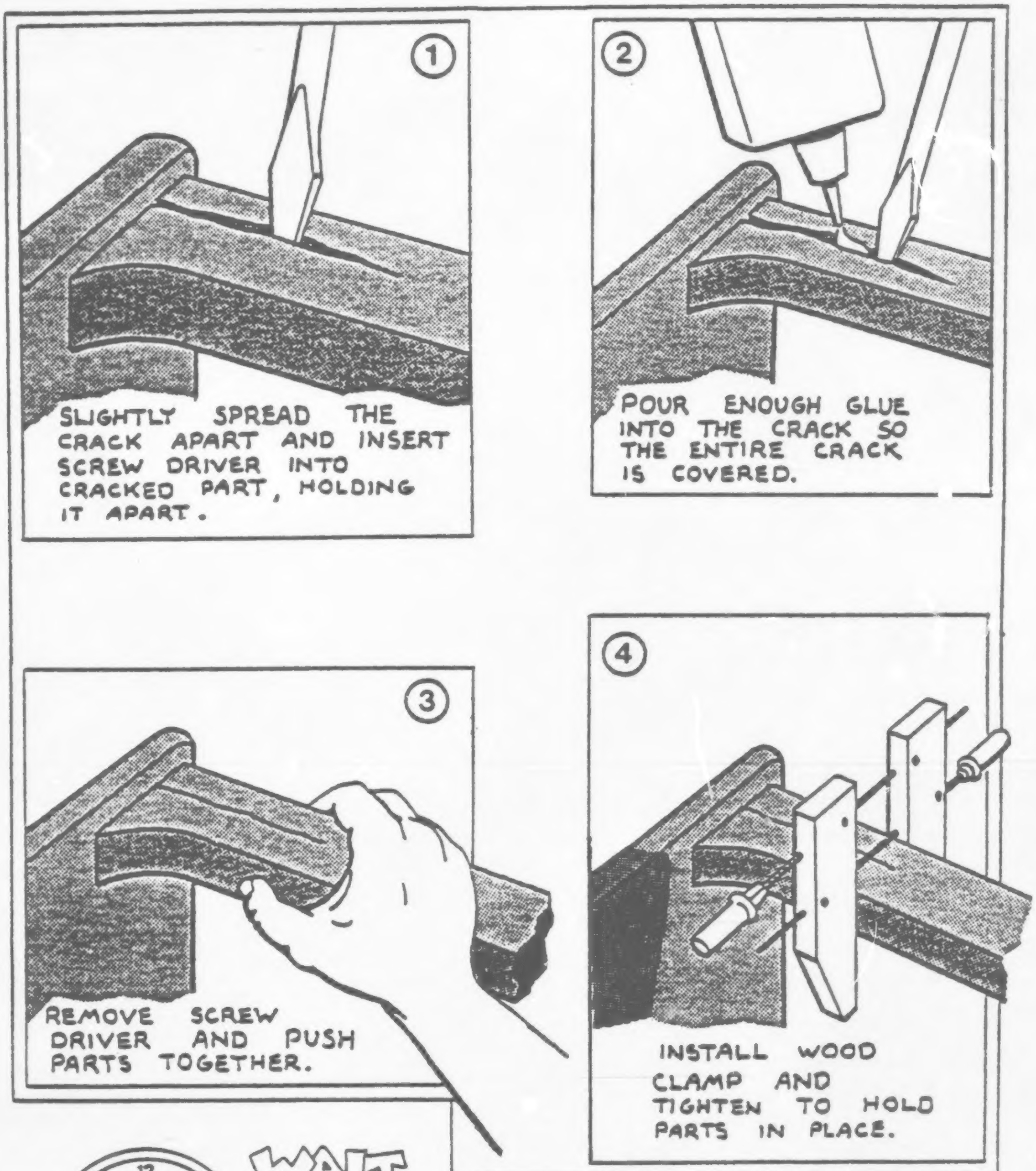
And In Order To Do This You Will Need:

- white glue
- screws
- plastic wood
- screwmate
- screwdriver
- wood clamp
- drill

We Will Know You Can Do It When:

You have glued the crack, screwed the crack closed, and filled screw holes with plastic wood so that the repaired area is as strong as before the wood crack.

JOB STEPS



1. SLIGHTLY SPREAD THE CRACK APART AND INSERT SCREW DRIVER INTO CRACKED PART, HOLDING IT APART.

2. POUR ENOUGH GLUE INTO THE CRACK SO THE ENTIRE CRACK IS COVERED.

3. REMOVE SCREW DRIVER AND PUSH PARTS TOGETHER.

4. INSTALL WOOD CLAMP AND TIGHTEN TO HOLD PARTS IN PLACE.

12
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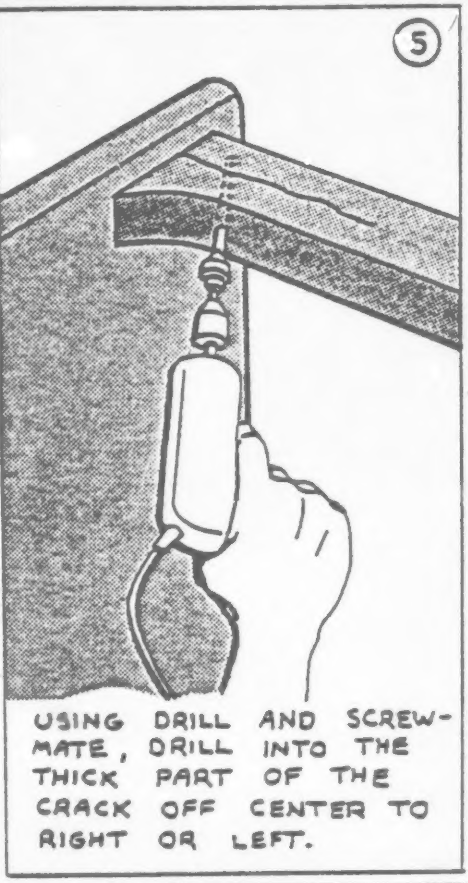
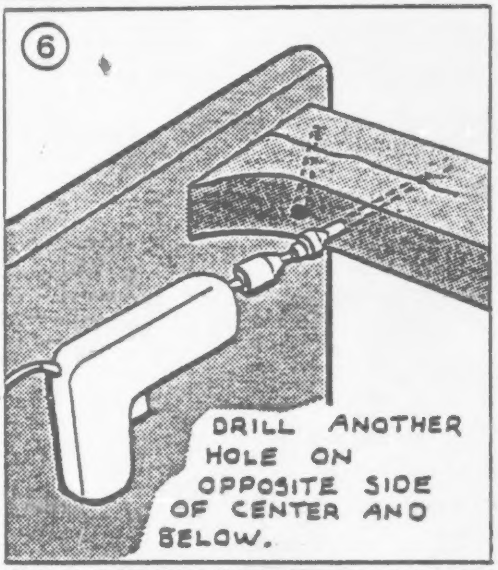
11

WAIT 2 HOURS FOR GLUE TO DRY BEFORE REMOVING CLAMPS

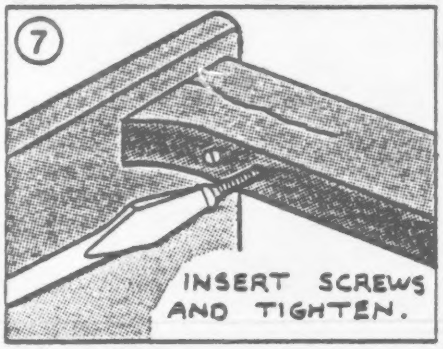
JOB STEPS



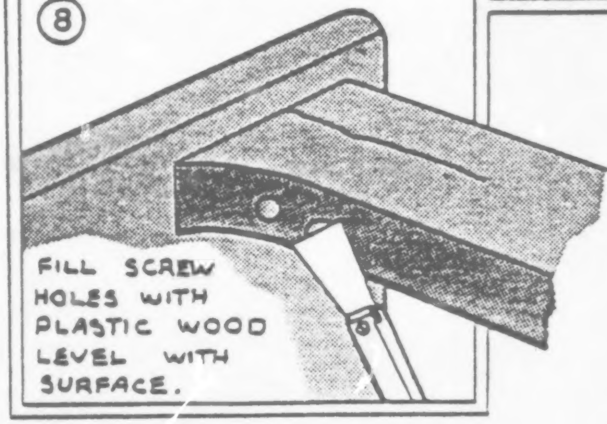
USING DRILL AND SCREW-MATE, DRILL INTO THE THICK PART OF THE CRACK OFF CENTER TO RIGHT OR LEFT.



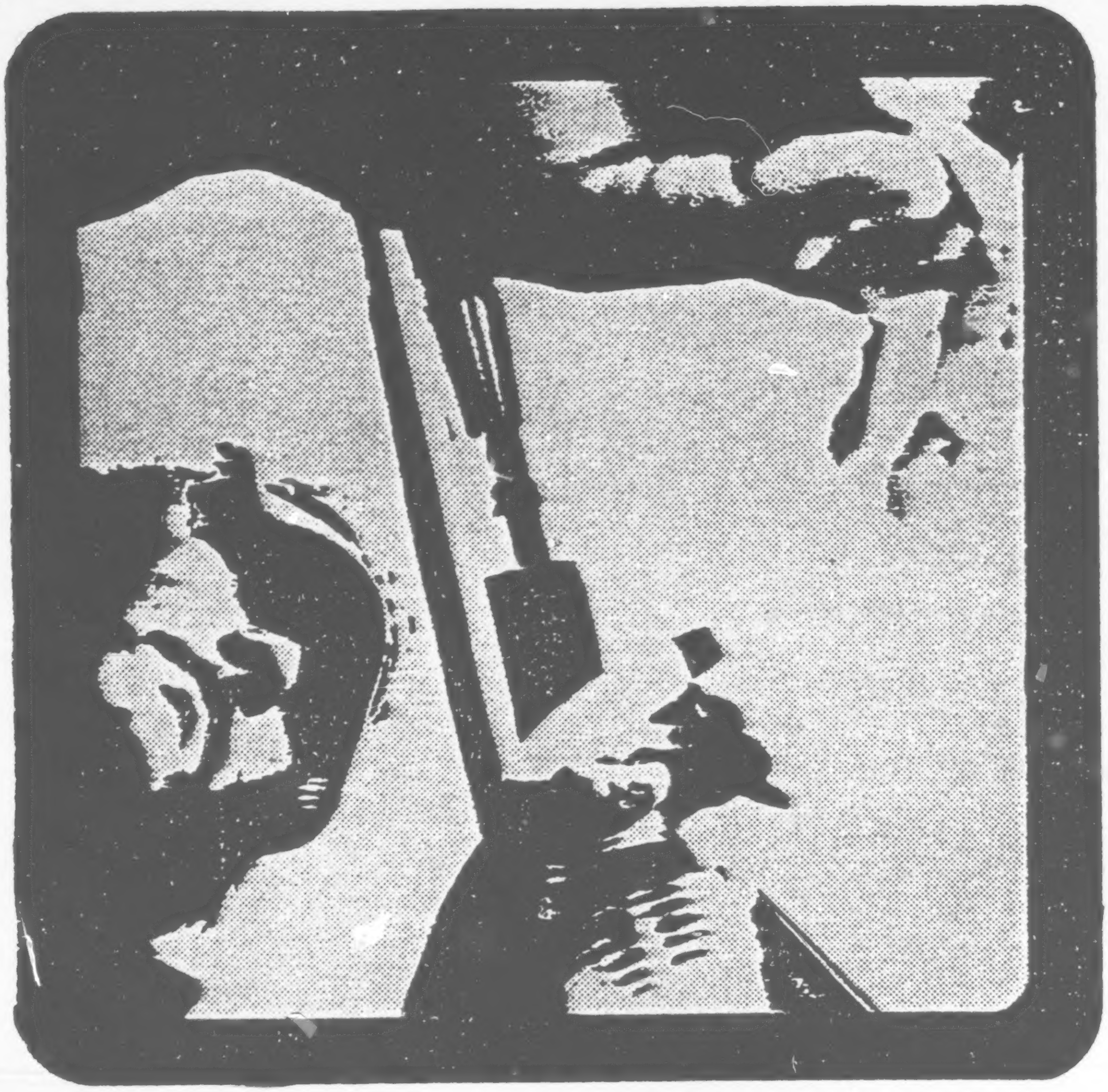
DRILL ANOTHER HOLE ON OPPOSITE SIDE OF CENTER AND BELOW.



INSERT SCREWS AND TIGHTEN.



FILL SCREW HOLES WITH PLASTIC WOOD LEVEL WITH SURFACE.



building maintenance & engineering

unit: Repair Damaged Furniture

capital area career center

module: 2201 22 003 date: 2/77 level: II

skill title: Fasten Wood With Dowel-Pins

developed & written by: Rov Haske

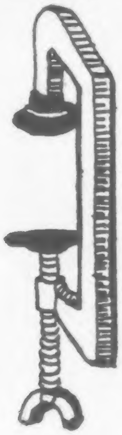
visuals by: Chuck Knock

WORD GUIDE

WHITE GLUE - A glue that dries clear.

DOWEL-PINS - Round wood pieces.

"C" CLAMP -



PERFORMANCE OBJECTIVE

You Are Going To Learn:

How to fasten wood together using Dowel-pins.

And In Order To Do This You Will Need:

- dowel-pin stock
- white glue
- electric drill
- metal "C" clamp
- drill bit
- hammer
- fine-tooth saw

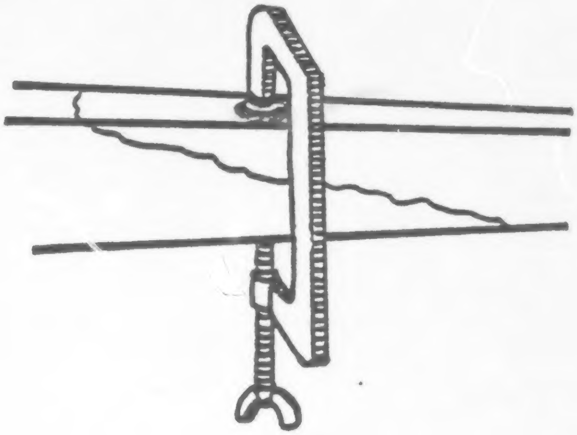
We Will Know You Can Do It When:

You have glued and fitted pins into two wood pieces at an angle so that the two pieces will not pull apart.

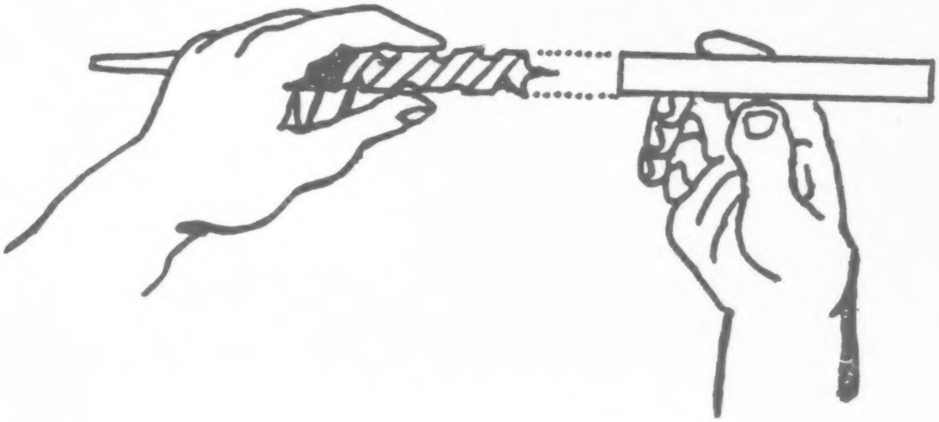
JOB STEPS

1. Glue and place the two broken pieces together so they fit as they were before the break.

2. Quickly place the metal "C" clamp so it holds the two pieces tightly together in between where the 2 pins will go.



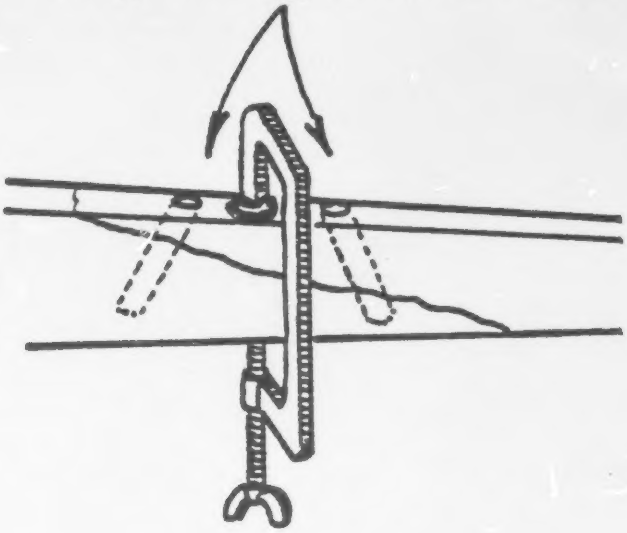
3. Match drill bit with the dowel pin size.



JOB STEPS

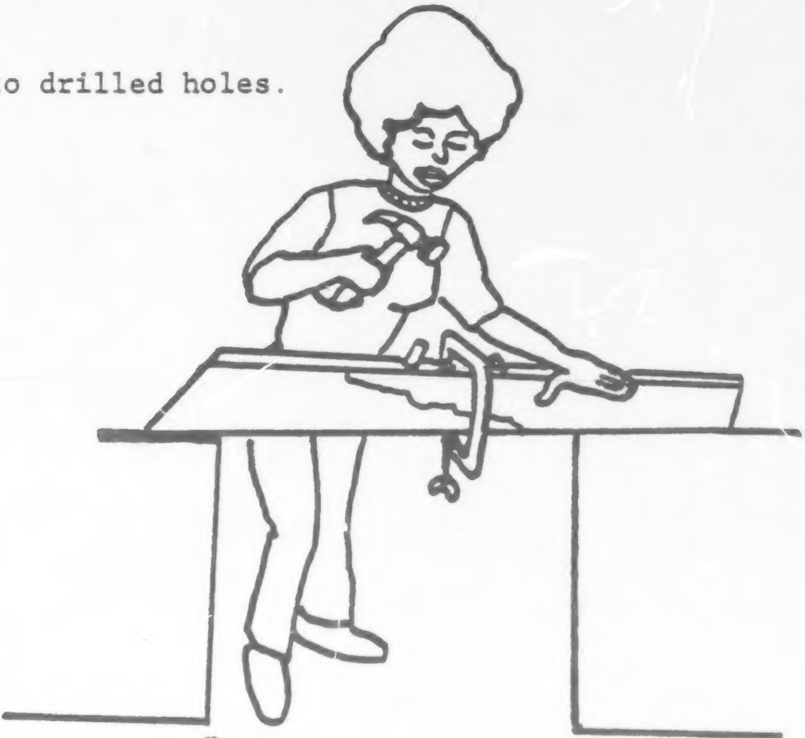
4. Place drill bit into drill chuck and tighten with chuck key. (If you don't remember how to operate an electric drill, see module 2201 20 002).

5. Drill 2 holes at opposite angles to each other as shown.



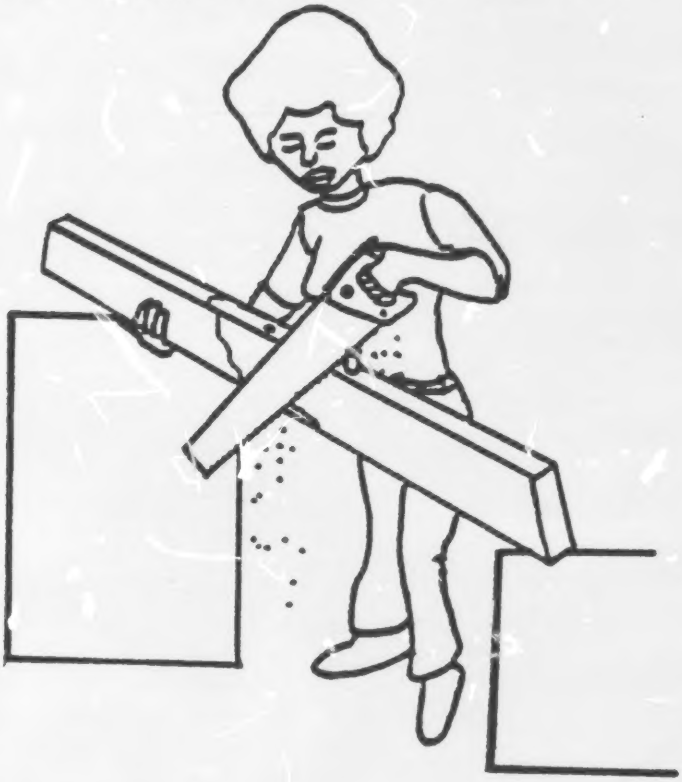
6. Apply white glue. Wipe off excess glue.

7. Hammer pin lightly into drilled holes.

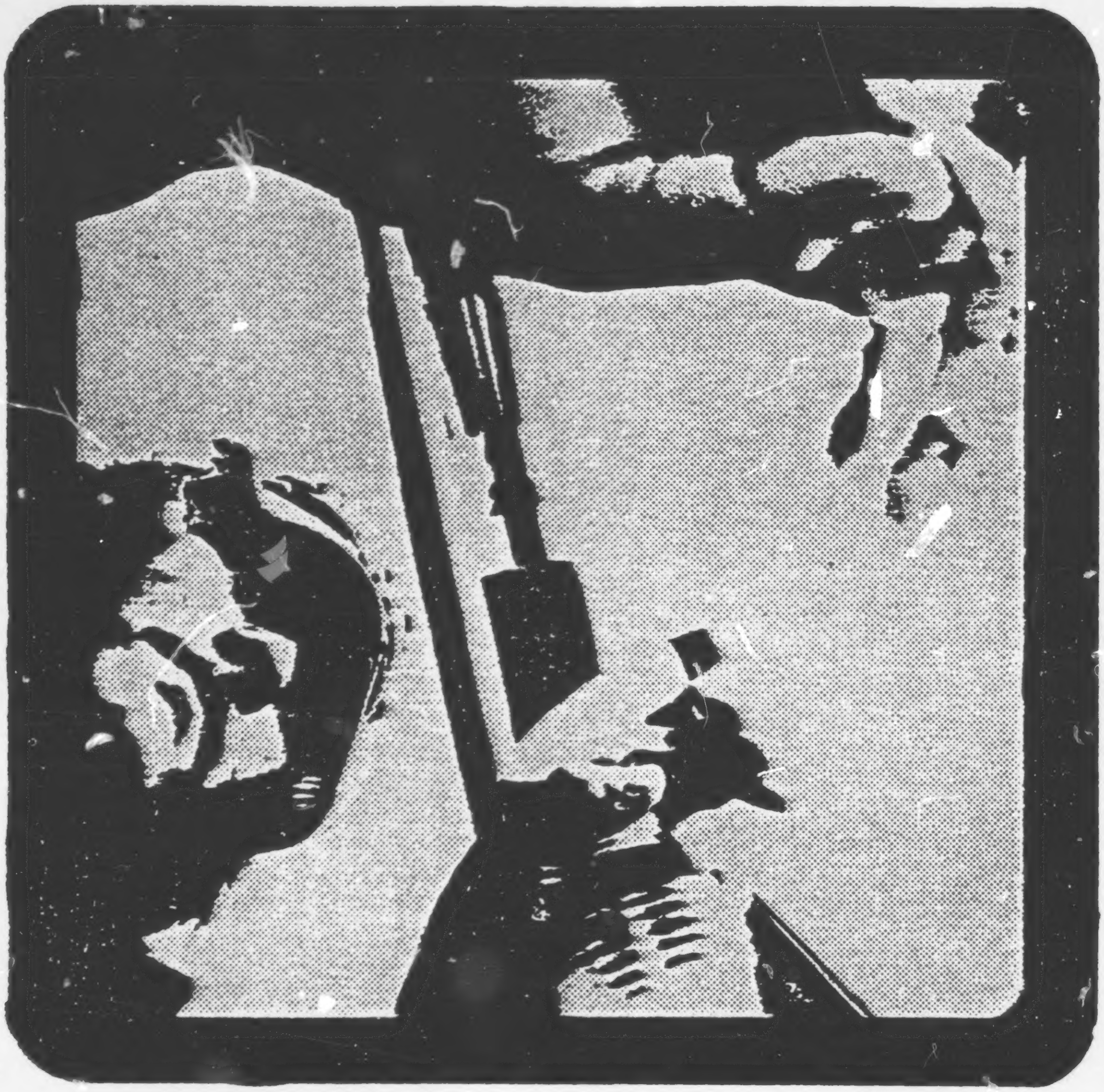


JOB STEPS

8. Saw pin even with wood. Use a fine-tooth saw, or hack saw.



9. Let dry for 24 hours.



building maintenance & engineering

unit: WINDOWS

capital area career center

module: 2201 23 001 date: 3/77 level: I

skill title: Visual Inspection - Windows

developed & written by: Roy Haske

visuals by: Chuck Knock

PERFORMANCE OBJECTIVE

You Are Going To Learn:

How to do a visual inspection of windows.

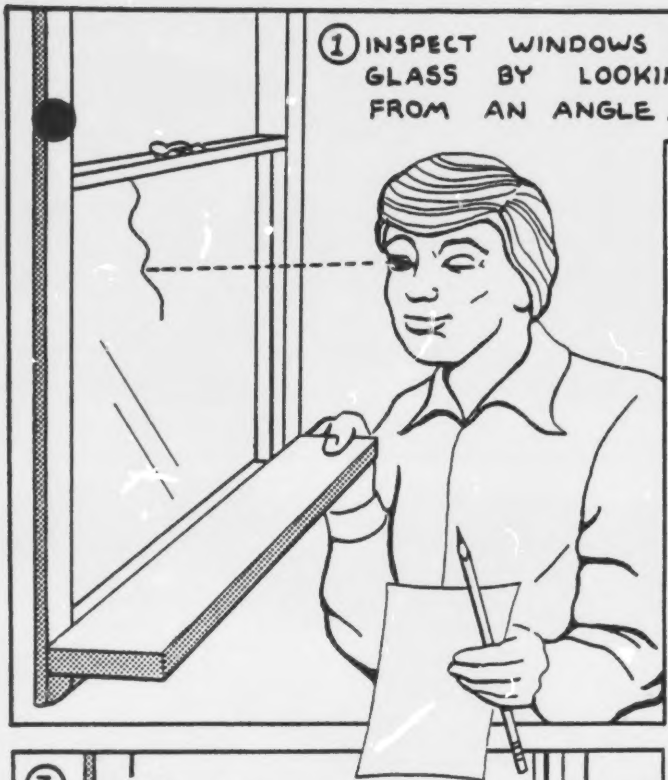
And In Order To Do This You Will Need:

A Pad

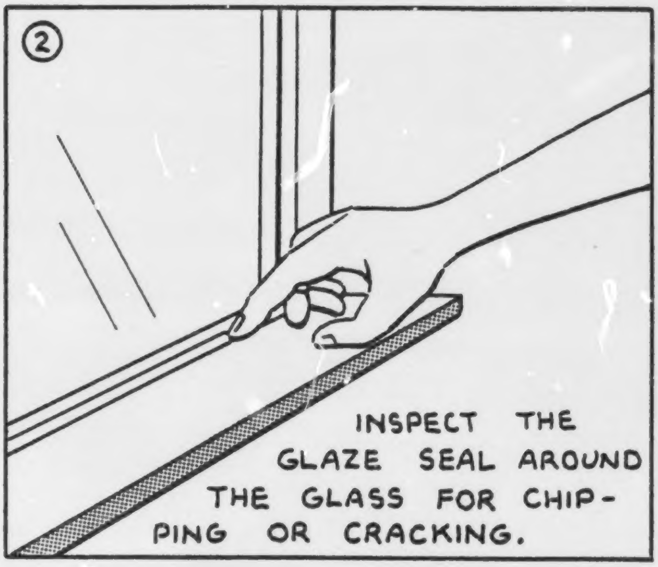
A Pencil

We Will Know You Can Do It When:

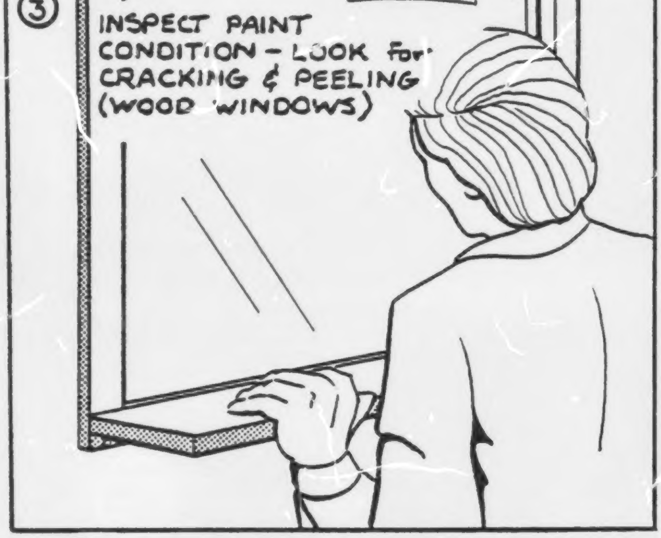
The windows you have inspected are safe, work properly, the seal around the glass is not chipped or cracked. If there is anything wrong it is noted on the note pad.



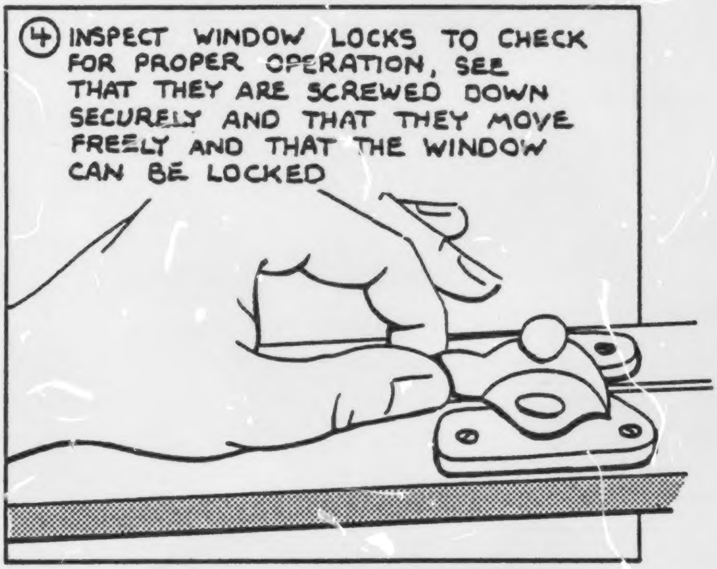
① INSPECT WINDOWS FOR CRACKS IN THE GLASS BY LOOKING AT THE GLASS FROM AN ANGLE.



② INSPECT THE GLAZE SEAL AROUND THE GLASS FOR CHIPPING OR CRACKING.

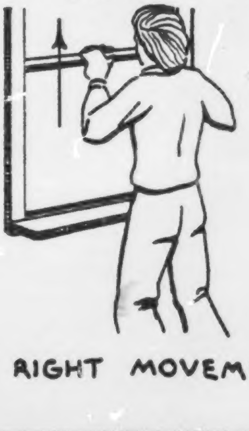


③ INSPECT PAINT CONDITION – LOOK for CRACKING & PEELING (WOOD WINDOWS)

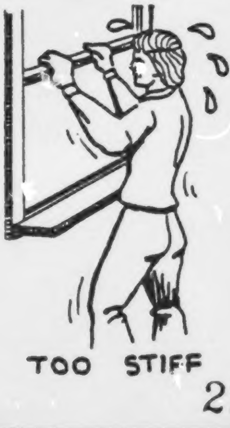


④ INSPECT WINDOW LOCKS TO CHECK FOR PROPER OPERATION, SEE THAT THEY ARE SCREWED DOWN SECURELY AND THAT THEY MOVE FREELY AND THAT THE WINDOW CAN BE LOCKED

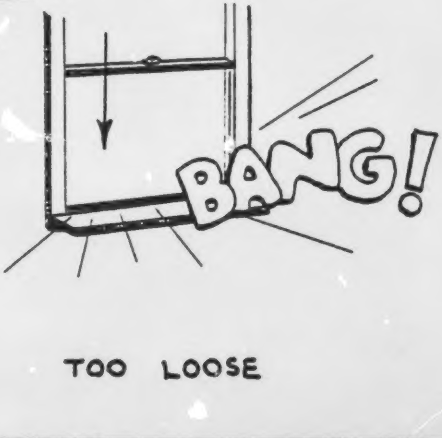
⑤ IF WINDOW OPENS AND CLOSES CHECK for FREEDOM of MOVEMENT. IT SHOULD LIFT EASILY & IT SHOULD NOT FALL



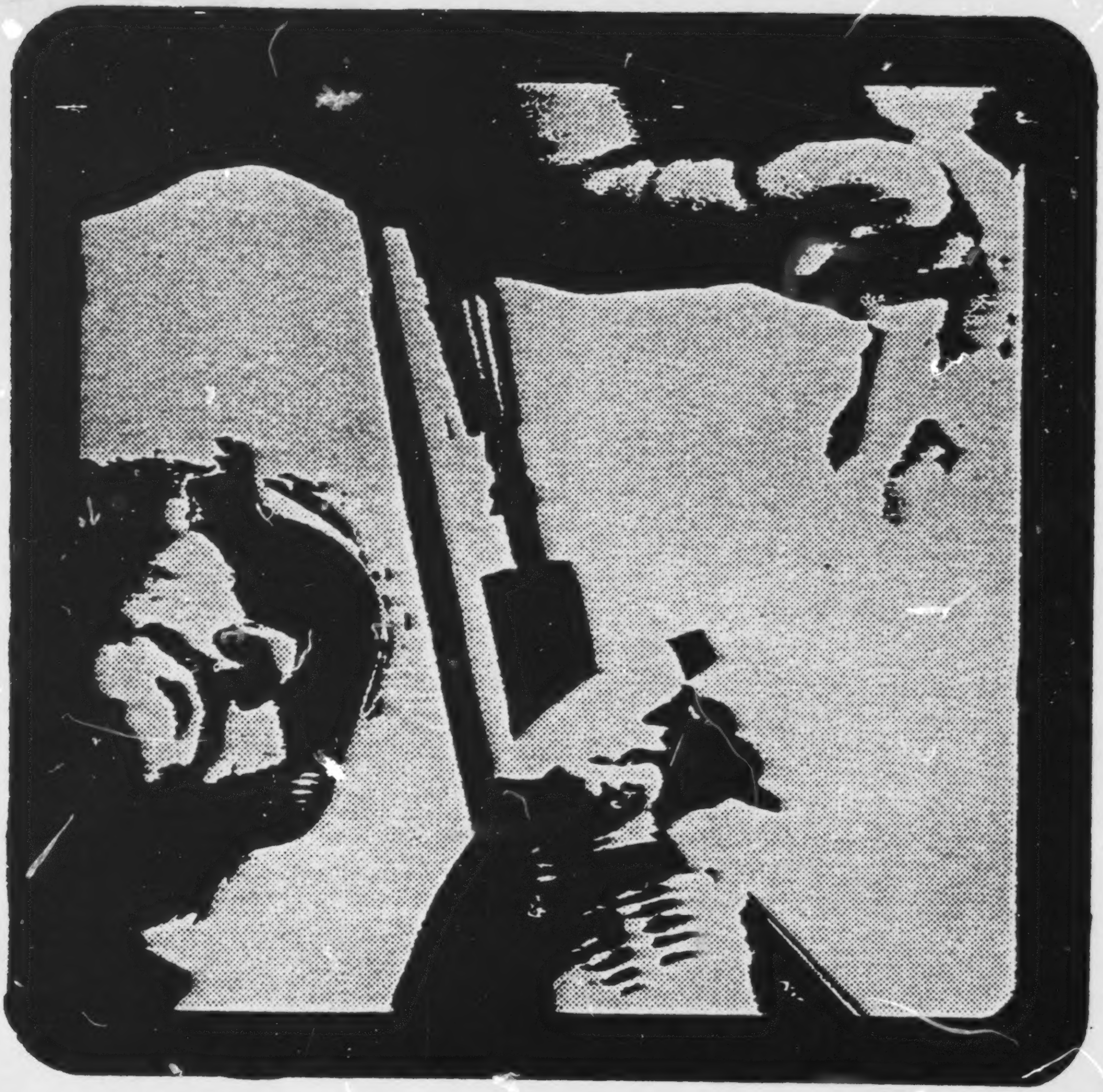
RIGHT MOVEMENT



TOO STIFF



TOO LOOSE



building maintenance & engineering

unit: WINDOWS

capital area career center

module: 2201 23 003 date: 3/77 level: I

skill title: Install Window Hardware

developed & written by: Roy Haske

visuals by: Chuck Knock

WORD GUIDE

CENTER PUNCH - Tool used to make a starter hole for a screw.

PERFORMANCE OBJECTIVE

You Are Going To Learn:

How to install window hardware.

And In Order To Do This You Will Need:

A Window Lock Set

Center Punch

Hammer

Screwdriver

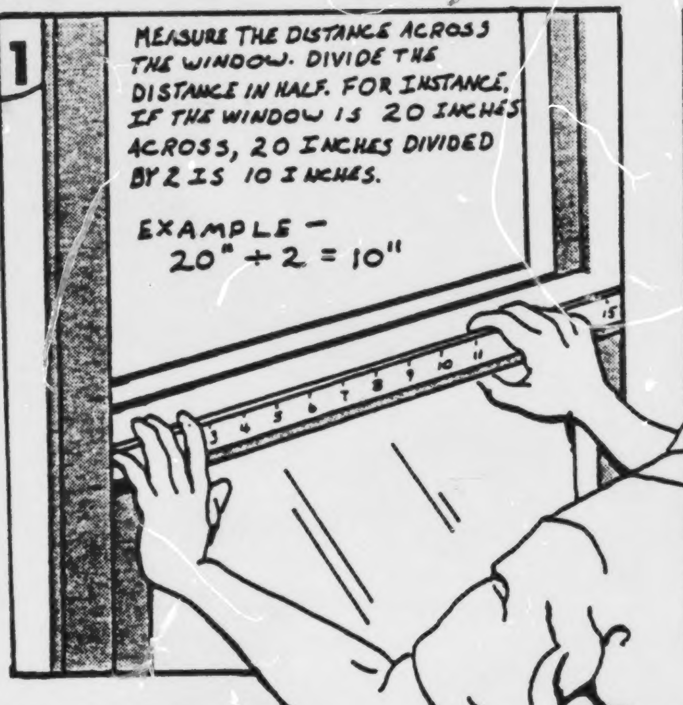
Ruler

Pencil

We Will Know You Can Do It When:

The lock set is installed in the center of the window frames and the latch can be opened and closed without touching either window frame.

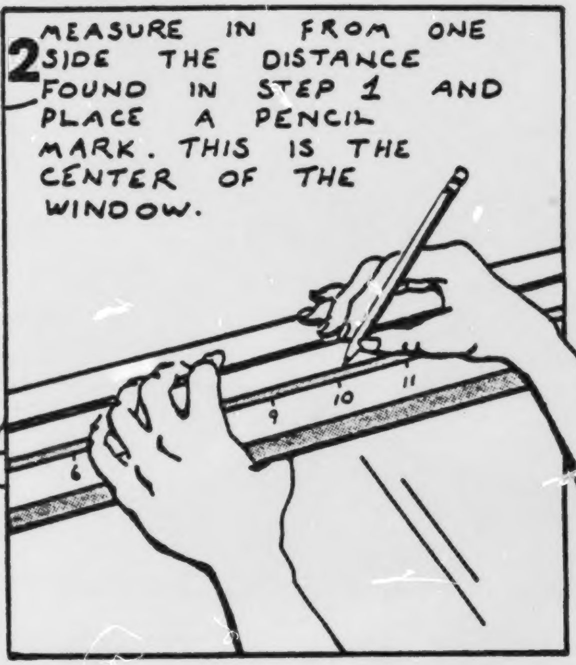
JOB STEPS



1

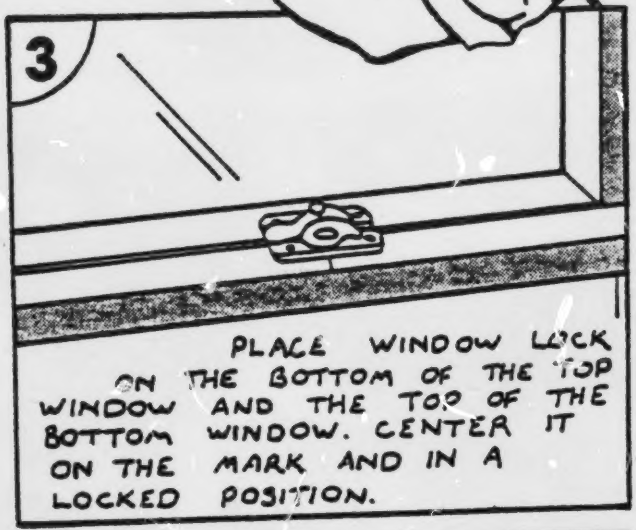
MEASURE THE DISTANCE ACROSS THE WINDOW. DIVIDE THE DISTANCE IN HALF. FOR INSTANCE, IF THE WINDOW IS 20 INCHES ACROSS, 20 INCHES DIVIDED BY 2 IS 10 INCHES.

EXAMPLE –
20" ÷ 2 = 10"



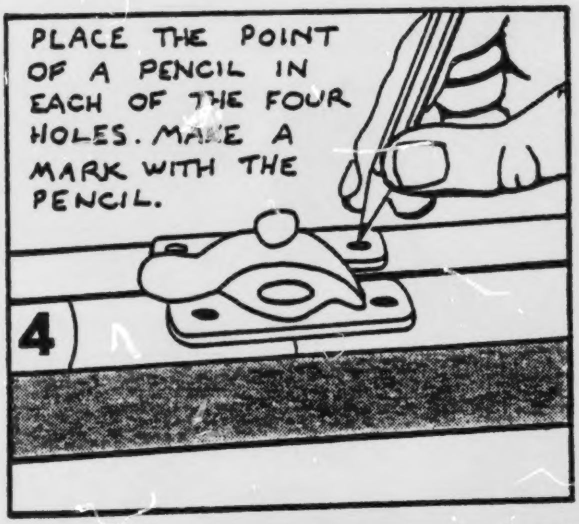
2

MEASURE IN FROM ONE SIDE THE DISTANCE FOUND IN STEP 1 AND PLACE A PENCIL MARK. THIS IS THE CENTER OF THE WINDOW.



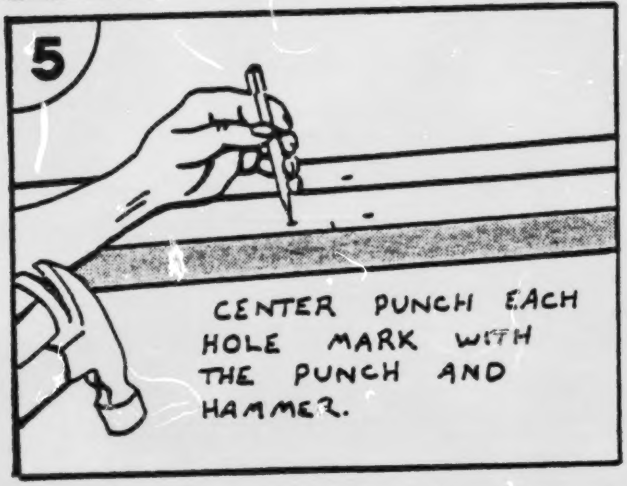
3

PLACE WINDOW LOCK ON THE BOTTOM OF THE TOP WINDOW AND THE TOP OF THE BOTTOM WINDOW. CENTER IT ON THE MARK AND IN A LOCKED POSITION.



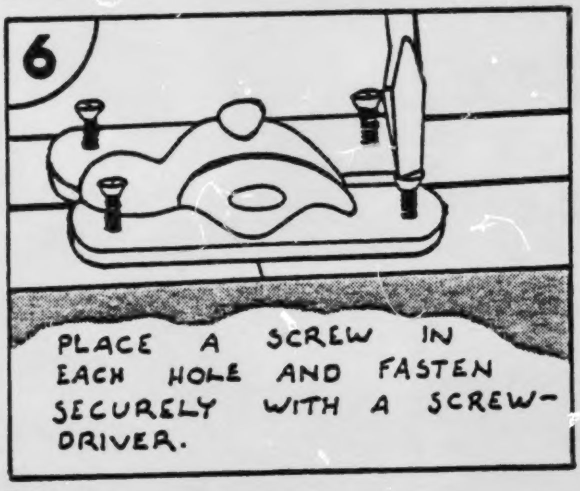
PLACE THE POINT OF A PENCIL IN EACH OF THE FOUR HOLES. MAKE A MARK WITH THE PENCIL.

4



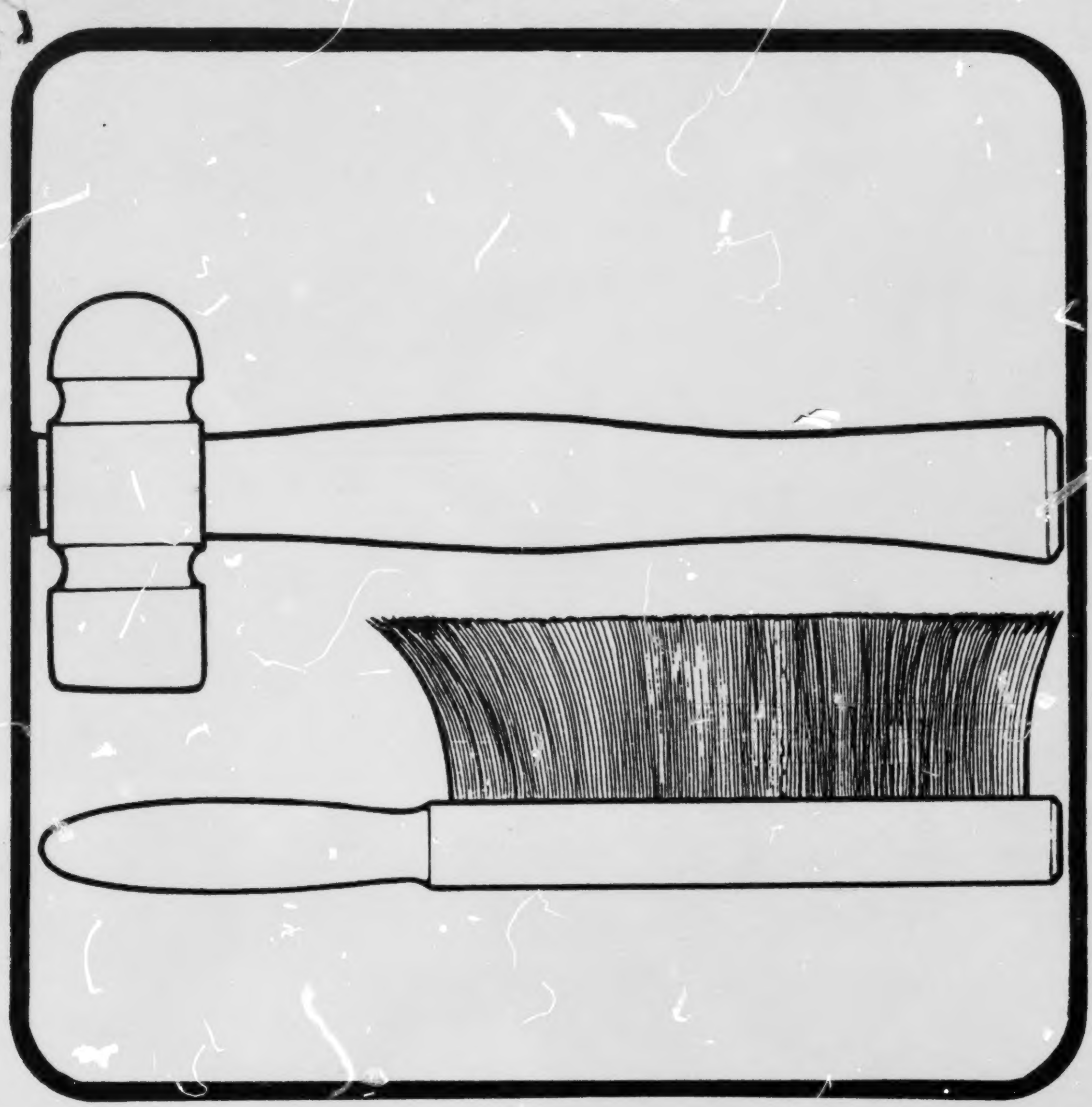
5

CENTER PUNCH EACH HOLE MARK WITH THE PUNCH AND HAMMER.



6

PLACE A SCREW IN EACH HOLE AND FASTEN SECURELY WITH A SCREW-DRIVER.



building maintenance & engineering

unit: WINDOWS

capital area career center

module: 2201 23 004 date: March 1977 level: I

skill title: Lubricate Windows

developed & written by: Roy Haske

visuals by: Chuck Knock

WORD GUIDE

LUBRICATE - Oil or make slippery.

PERFORMANCE OBJECTIVE

You are going to learn:

How to lubricate window tracks.

And in order to do this you will need:

A can of silicone spray.

A window.

We will know you can do it when:

The window moves up and down or sideways without sticking.

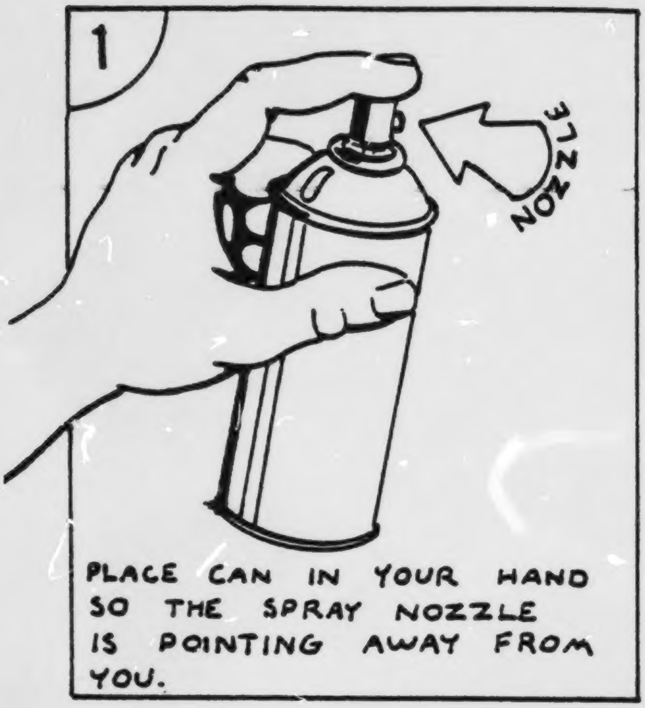
INFORMATION

NOTE: Silicone spray can be used on either wood or aluminum tracks but not on windows that move on a friction track. A friction track is a wood frame window with an aluminum track. By pressing on the track it will seem to be loose. The aluminum presses against the frame holding it in place. If you lubricate this type window, it will slip out of place.

> CAUTION! Do not point the spray at anything except the window track.

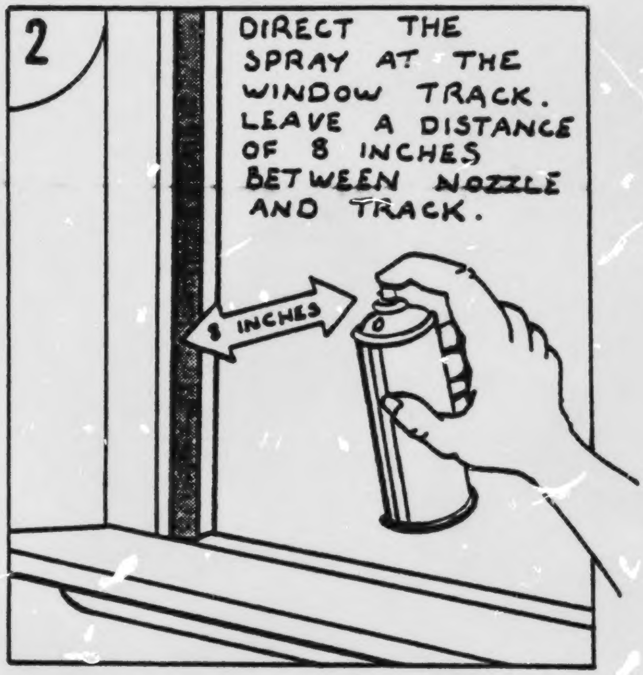
JOB STEPS

1



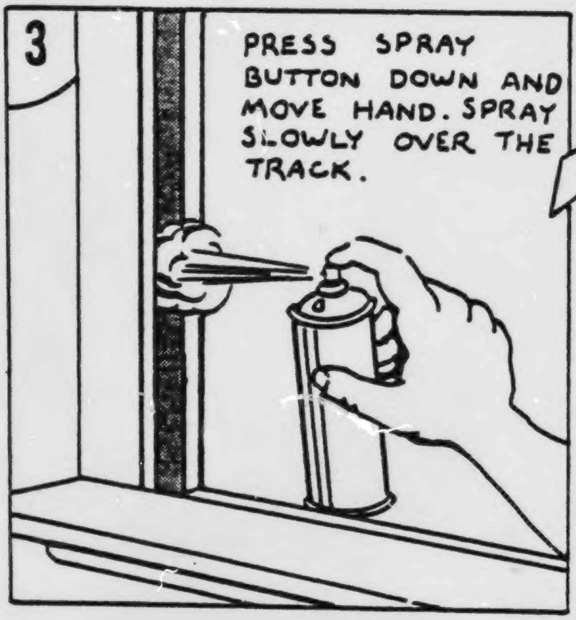
PLACE CAN IN YOUR HAND SO THE SPRAY NOZZLE IS POINTING AWAY FROM YOU.

2



DIRECT THE SPRAY AT THE WINDOW TRACK. LEAVE A DISTANCE OF 8 INCHES BETWEEN NOZZLE AND TRACK.

3

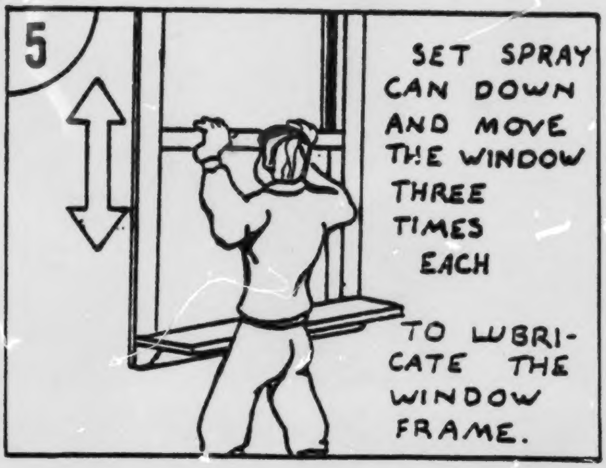


PRESS SPRAY BUTTON DOWN AND MOVE HAND. SPRAY SLOWLY OVER THE TRACK.

4

DO THE SAME TO THE TRACK.

5



SET SPRAY CAN DOWN AND MOVE THE WINDOW THREE TIMES EACH TO LUBRICATE THE WINDOW FRAME.

building maintenance & engineering

unit: Door Maintenance

capital area career center

module: 2~~0~~201 24 001 **date:** 2/77 **level:** I

skill title: Visual Inspection and Maintenance of Doors

developed & written by: Dan Woodward

visuals by: Chuck Knock

PERFORMANCE OBJECTIVE

You Are Going To Learn:

How to visually inspect and maintain doors in a building.

And In Order To Do This You Will Need:

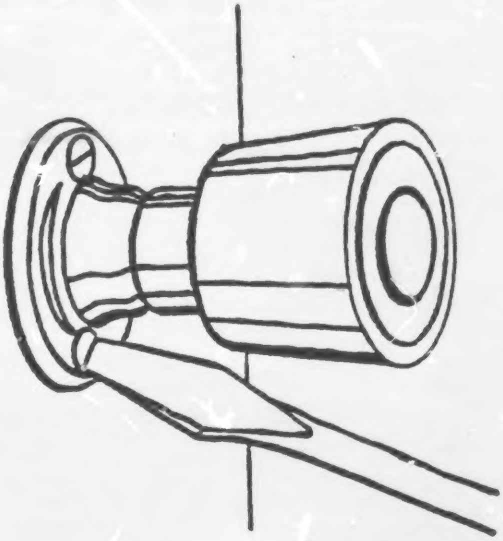
mounted door in a building
screwdriver
oil can
pad
pencil

We Will Know You Can Do It When:

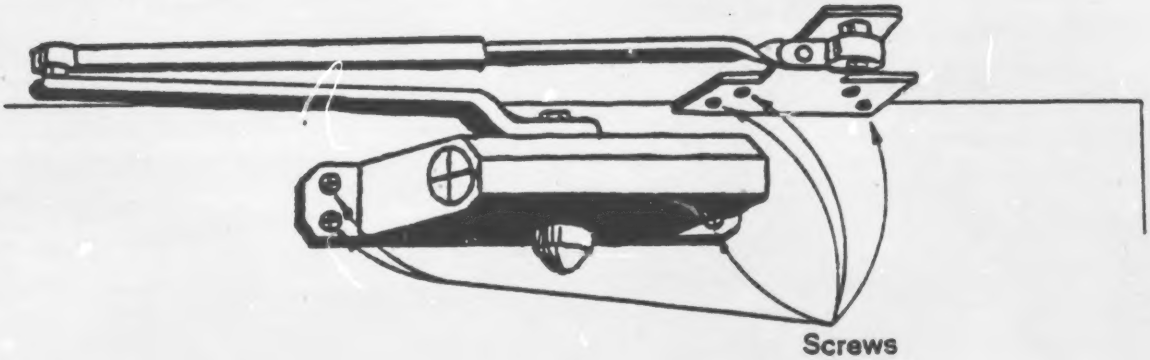
1. The door closers, hinges, door knobs, kick-plates, are tight.
2. The sweep and latch speed is properly adjusted.
3. Any material damage is written down and reported for repair.
4. Hinges are oiled.

JOB STEPS

1. Check door knob by opening and closing the door many times. Screws that hold the knob and parts to the door may be loose. Tighten any of them, if they are loose.



2. Check the door closer for loose screws and tighten if needed.

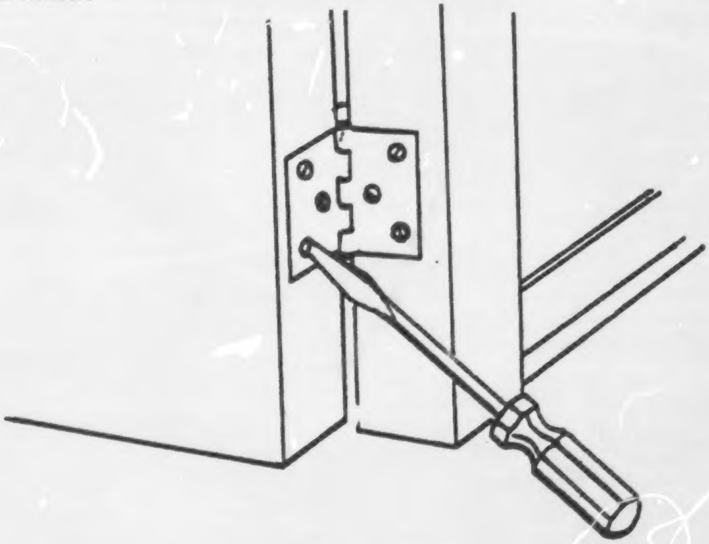


WORD GUIDE

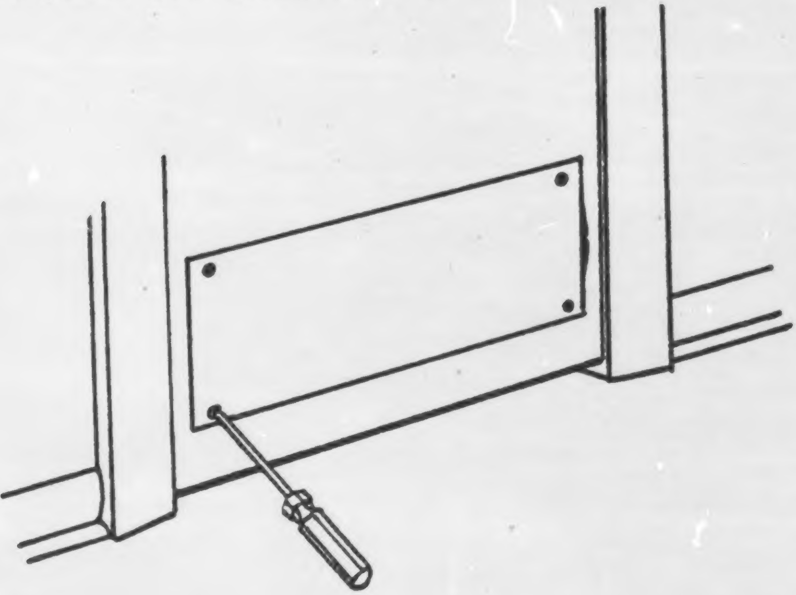
KICK-PLATE - A metal plate on door bottom that protects it from bumps and scratches.

JOB STEPS

3. Check door hinges for loose screws on the door and door frame.



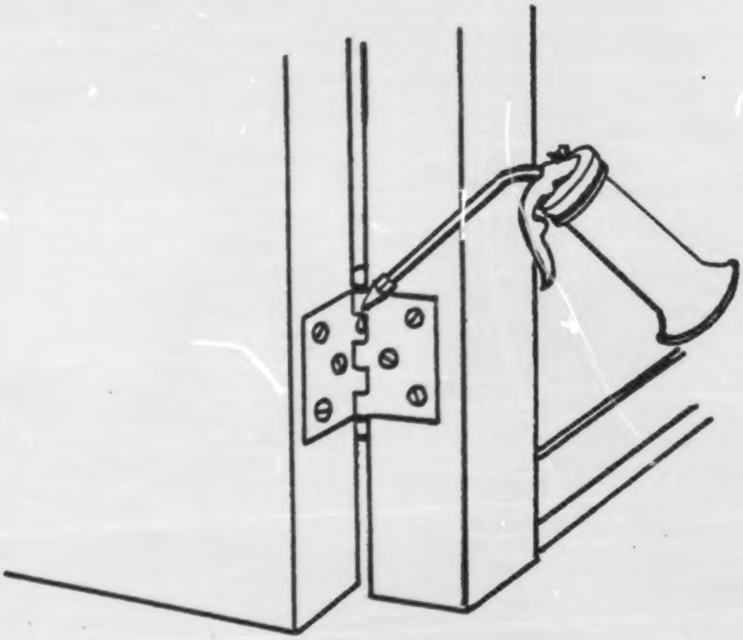
4. Check kick-plate for loose screws.



JOB STEPS

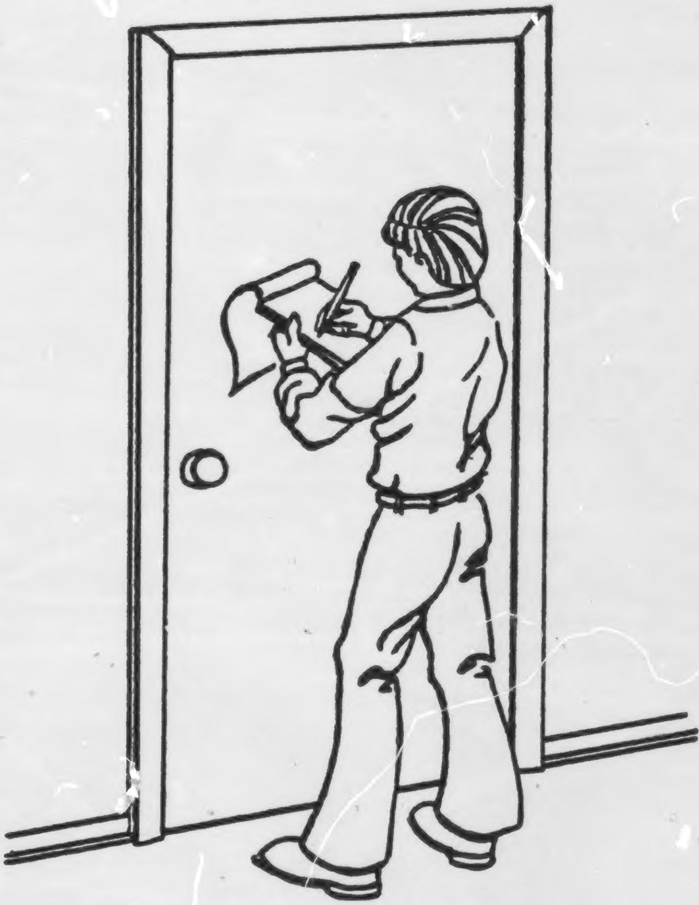
5. Check door closer sweep and latch speed according to Module #2201 02 024R. Adjust if needed.

6. Oil hinges. Open and close door many times to work oil down into the hinge.



JOB STEPS

7. Check door for damage. If it is a wood door check it for wood slivers and damaged finish. Make a note for repair or replacement if needed.



building maintenance & engineering

unit: Door Maintenance

capital area career center

module: 2201 24 002 date: 2/77 level: II

skill title: Hang a Door

developed & written by: Mike Polen

visuals by: Chuck Knock and Bill Draper

WORD GUIDE

CLEARANCE - Space needed to fit without sticking.

PERFORMANCE OBJECTIVE

You Are Going To Learn:

How to hang a door.

And In Order To Do This You Will Need:

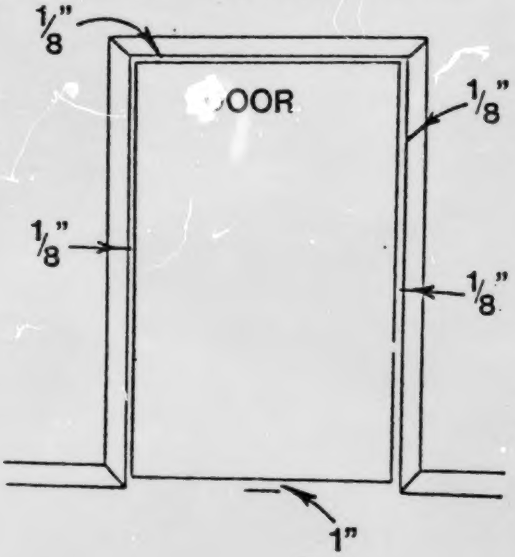
- door
- door opening
- pair of hinges
- steel tape
- router and bit
- hammer
- center punch
- tri-square
- wood wedges
- pencil

We Will Know You Can Do It When:

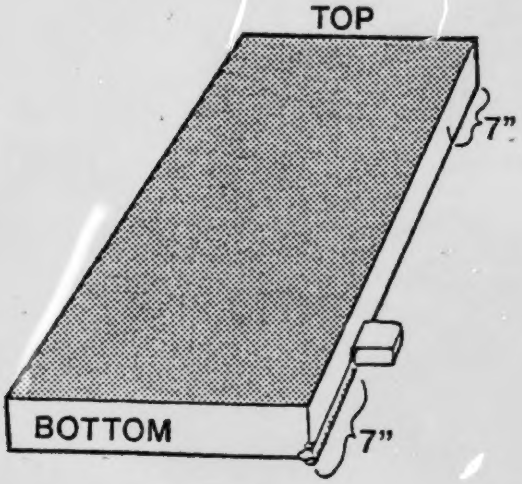
The door you have checked has the proper clearance (1/8 inch at the top and sides, 1 inch at the bottom) and the door does not stick when it is opened and closed.

JOB STEPS

1. Place the door in the door opening. Trim to fit with 1/8 inch clearance on top and sides - 1 inch clearance at the bottom.

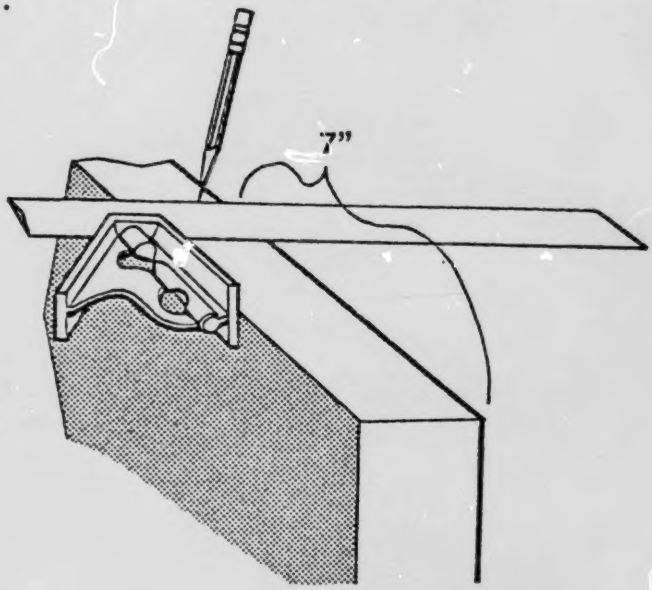

1/8"
DOOR
1/8"
1/8"
1/8"
1"

2. Measure down 7 inches from the top of the door and 7 inches up from the bottom and place a mark on the narrow edge.

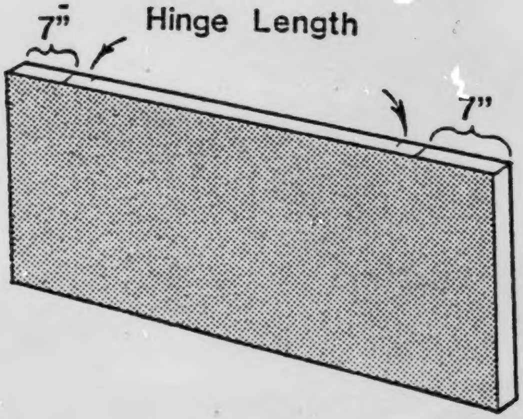

TOP
7"
BOTTOM
7"

JOB STEPS

3. Place a tri-square on the marks. Draw a line across the narrow edge.

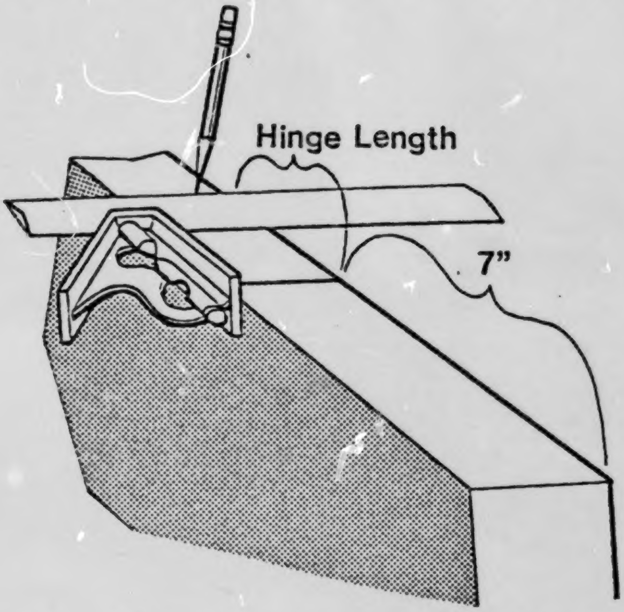


4. Measure the length of the hinge. Mark the hinge length on the door toward the center from each mark for step 3.



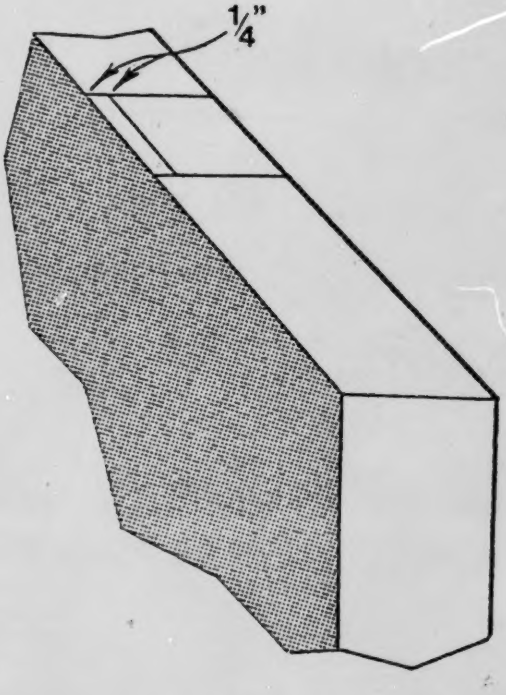
JOB STEPS

5. Place tri-square across each mark and draw a line across narrow edge.



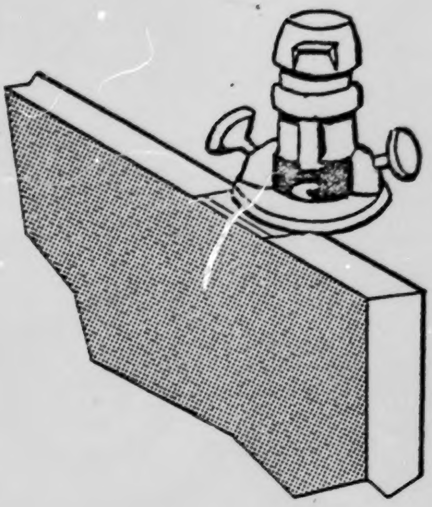
6. On 1 3/4 inch thick door draw a line 1/4 inch in from the inside edge between both sets of marks.

NOTE: THE HINGE PIN MUST BE ON THE OUTSIDE OF THE DOOR.

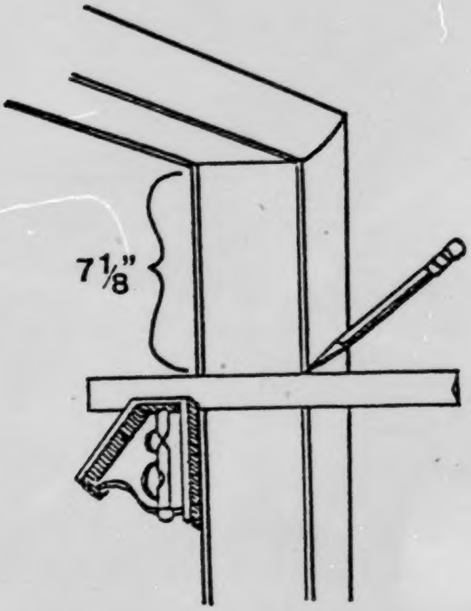


JOB STEPS

7. Set the router bit to cut the thickness of the hinge and route out inside of the drawn lines.

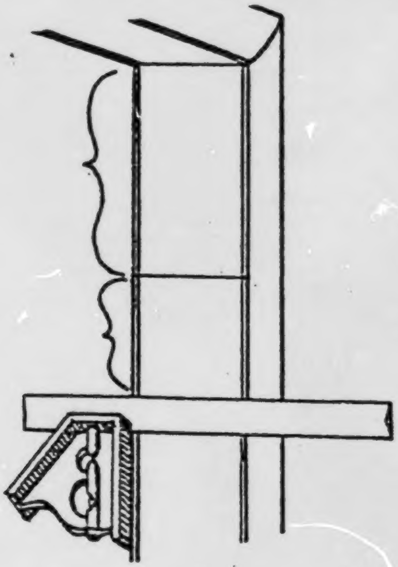


8. Measure down 7 1/8 inches from the top of the door casing on the hinge side. Mark and square it.

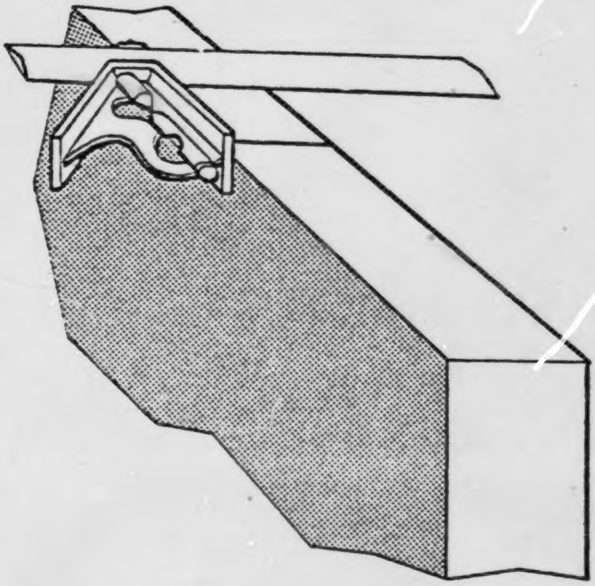


JOB STEPS

9. Measure down the length of the hinge from the mark in step 8. Mark and square.



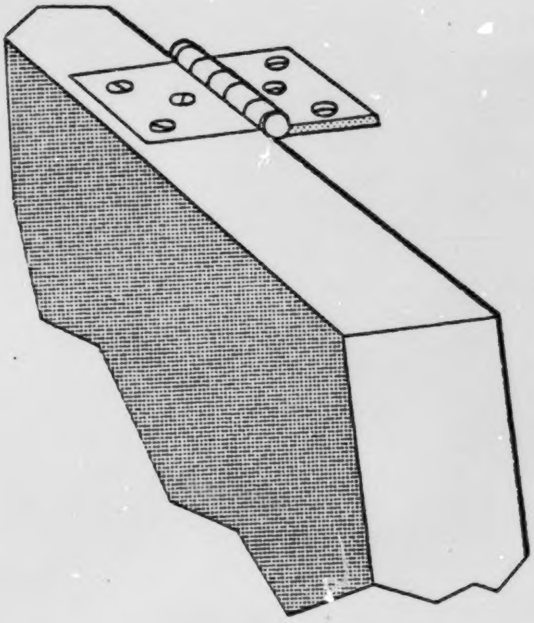
10. Measure the distance from the edge of the hinge to the edge of the door. Transfer that measurement to the door casing.



JOB STEPS

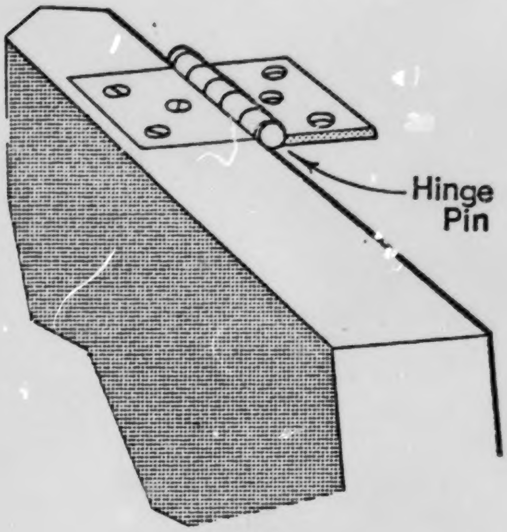
11. Rout out the thickness of the hinge as you did in step 7.

12. Set hinge into the routed area. Fasten with screws.

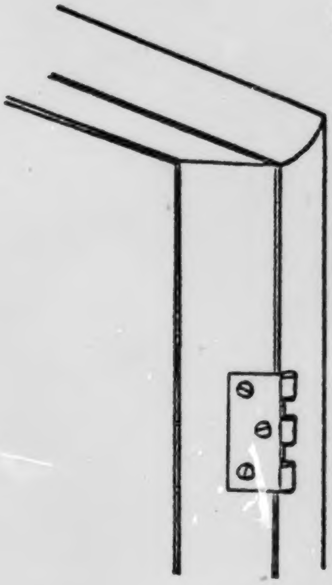


JOB STEPS

13. Take the hinge apart by pulling out the pin in the center of the hinge.

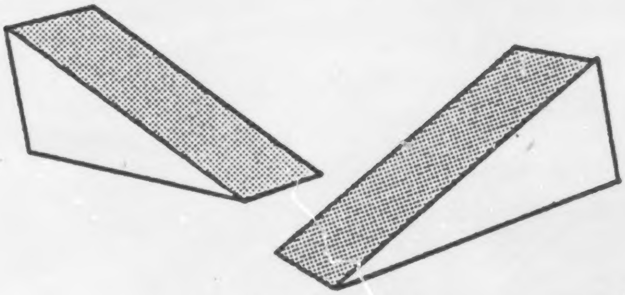


14. Place the half hinge in place of the cut but in the door casing. Fasten with screws.

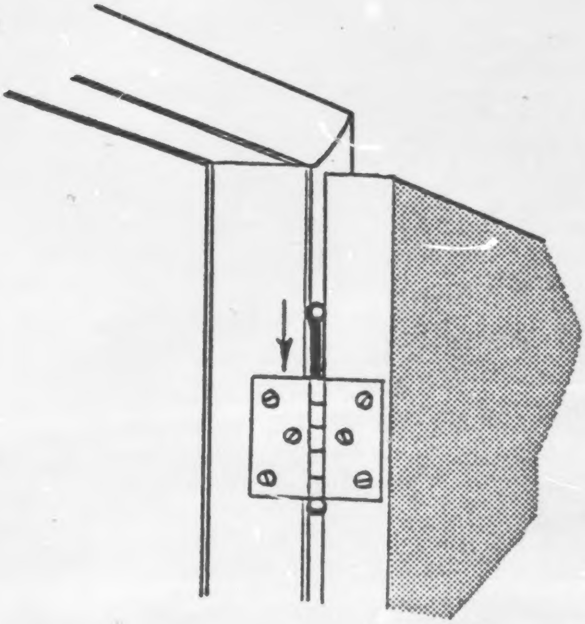


JOB STEPS

15. Cut two pieces of 2 x 4 into a wedge shape.

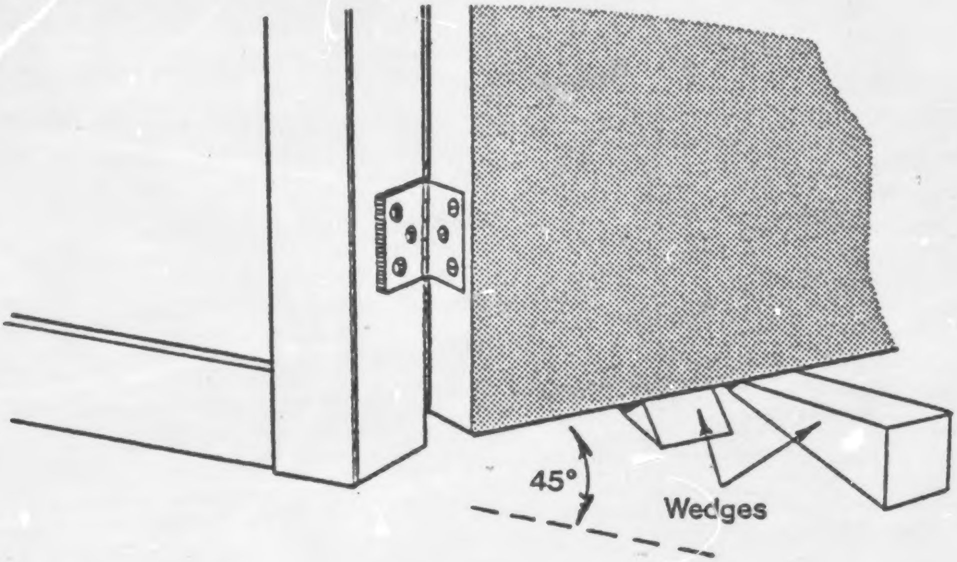


16. Hang the door on the top hinge and push the pin through the hinge.

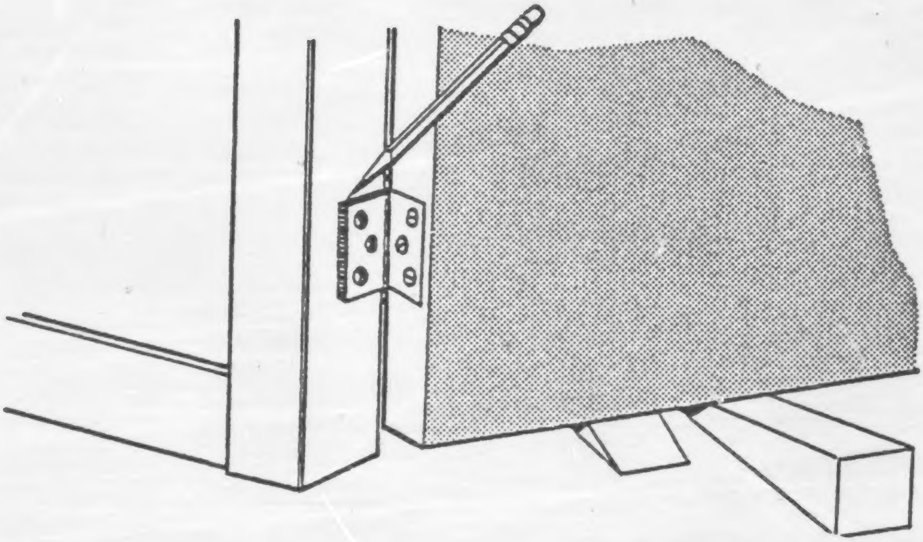


JOB STEPS

17. Open the door about 45 degrees and line up the bottom hinge with the wedges until the door is level.



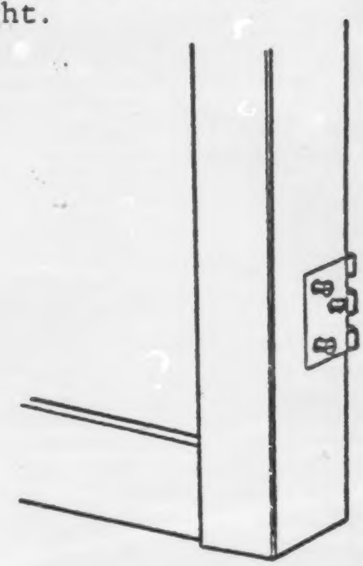
18. Draw a line around the hinge on the door casing.



JOB STEPS

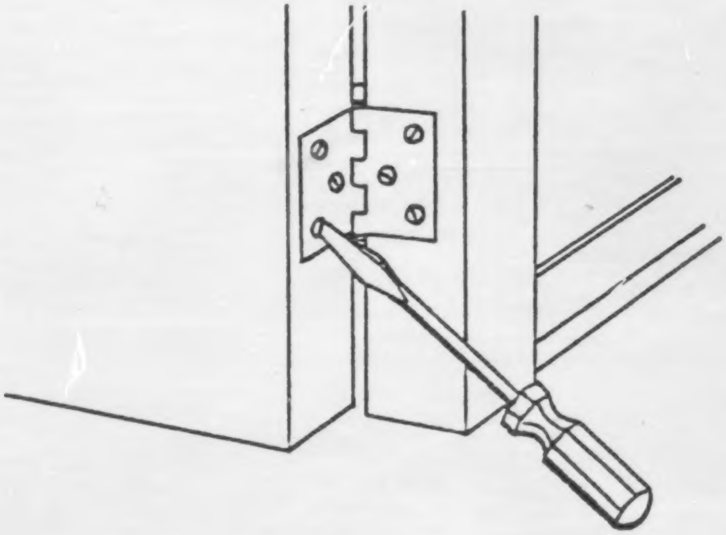
19. Remove the door and rout the area as done in step 11.

20. Remove half of the lower hinge. Fasten in place, but do not fasten tight.



21. Hang door on hinges. Push both pins in place.

22. Finish tightening screws in lower hinge.



JOB STEPS

23. Open and shut door to check for free movement.

NOTE: HEAVIER DOORS NEED 3 HINGES - SET 1/2 WAY BETWEEN FIRST TWO.

building maintenance & engineering

unit: Door Maintenance

capital area career center

module: 2201 24 003 date: 4-1-77 level: II

skill title: Install Door Locks

developed & written by: Roy Haske

visuals by: Chuck Knock

PERFORMANCE OBJECTIVE

You are going to learn:

How to install a door lock assembly.

And in order to do this you will need:

- steel tape measure
- pencil
- drill and bits
- hammer
- wood chisel
- screwdriver
- center-punch

We will know you can do it when:

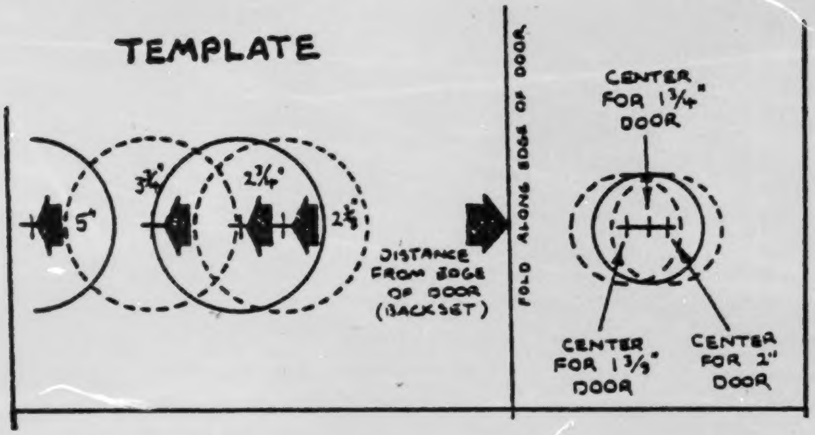
The door knob does not stick when turned either way. The door closes and latches without using force to close it.

WORD GUIDE

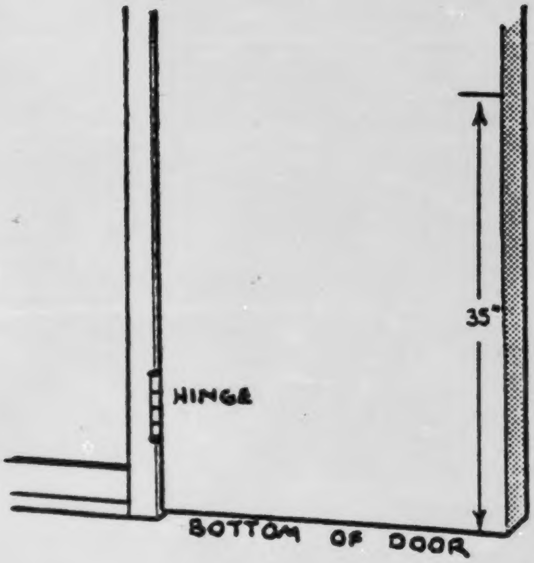
TEMPLATE - a pattern for drilling holes in the exact spot.

JOB STEPS

NOTE: There is a template on each box to use for drilling exact holes (see drawing).

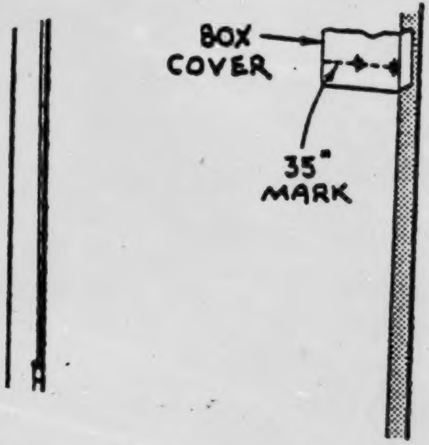

TEMPLATE
5"
3 3/4"
2 3/4"
2 3/8"
DISTANCE FROM EDGE OF DOOR (BACKSET)
FOLD ALONG EDGE OF DOOR
CENTER FOR 1 3/4" DOOR
CENTER FOR 1 3/8" DOOR
CENTER FOR 2" DOOR

1. Measure up 35" from the bottom of the door, opposite the side the hinges are on. Mark this spot.

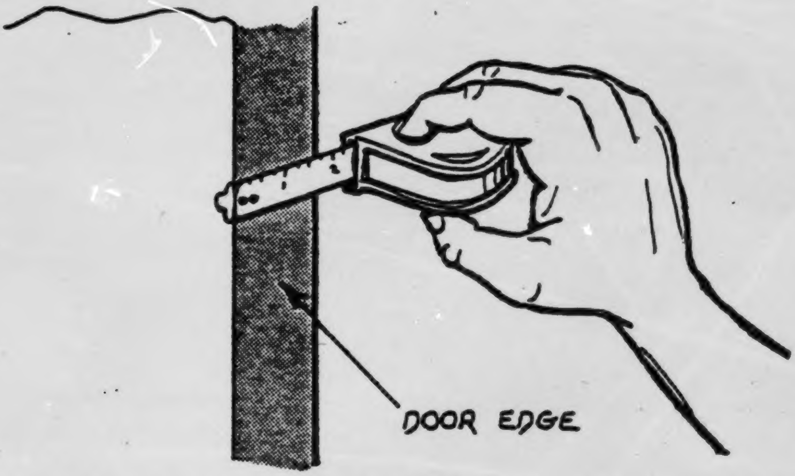

35"
HINGE
BOTTOM OF DOOR

JOB STEPS

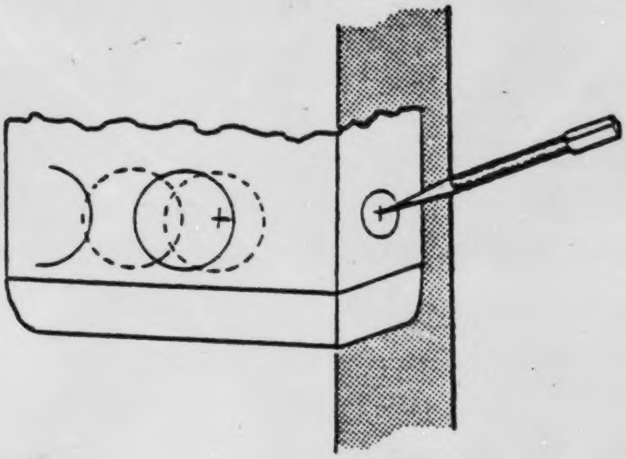
2. Remove the template from the box and place it on the door so that the arrows line up with the mark made in Step #1. The fold line should be on the door edge.



3. Measure the thickness of the door.



4. Fold the template around the door edge. Drive a punch through the closest mark that stands for the thickness of the door.

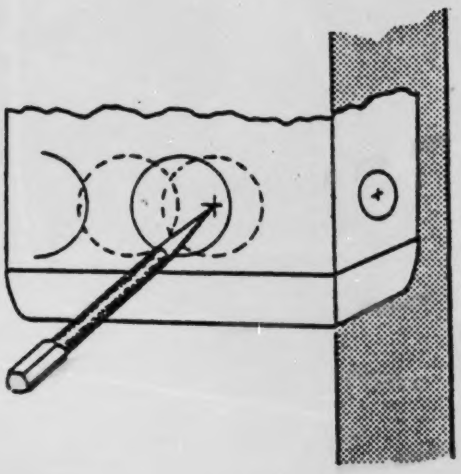


WORD GUIDE

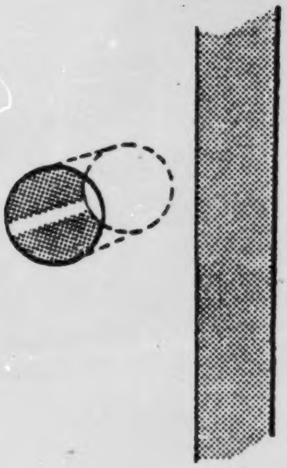
BACKSET - distance from the edge of the door to the center of the door knob hole.

JOB STEPS

5. Holding the template in place, punch mark the backset. (This is the distance from the door edge to the center of the door knob shaft).



6. Drill a 2 1/8" diameter hole through the door at the backset punch mark.



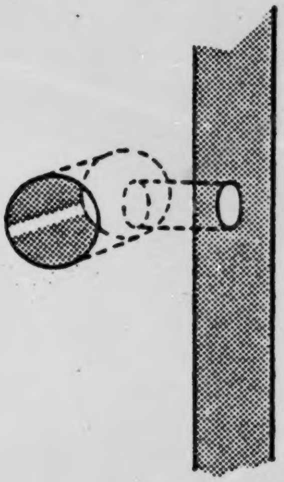
WORD GUIDE

BEVEL - a slanted edge.

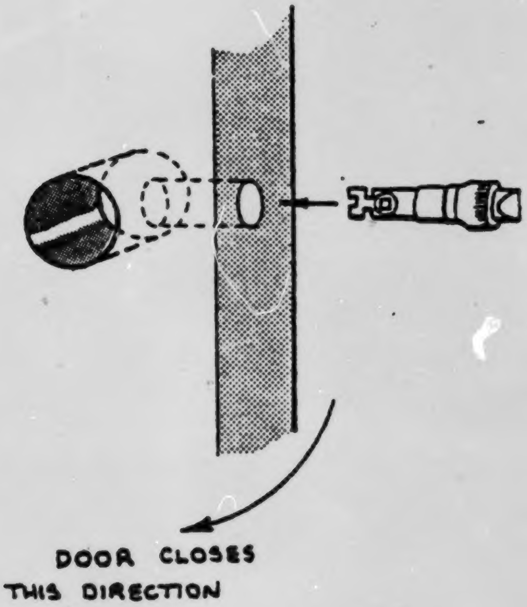
DOOR LATCH - part that keeps the door in a closed position.

JOB STEPS

7. Drill a 1" diameter hole in the narrow edge of door until it comes through the backset hole. (MUST BE DRILLED LEVEL). Drill it where you punched in step 3.

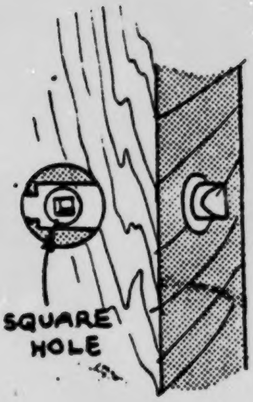


8. Place a door latch into the 1" hole. The shaft end goes in first and the bevel edge of spring latch faces the direction the door closes.

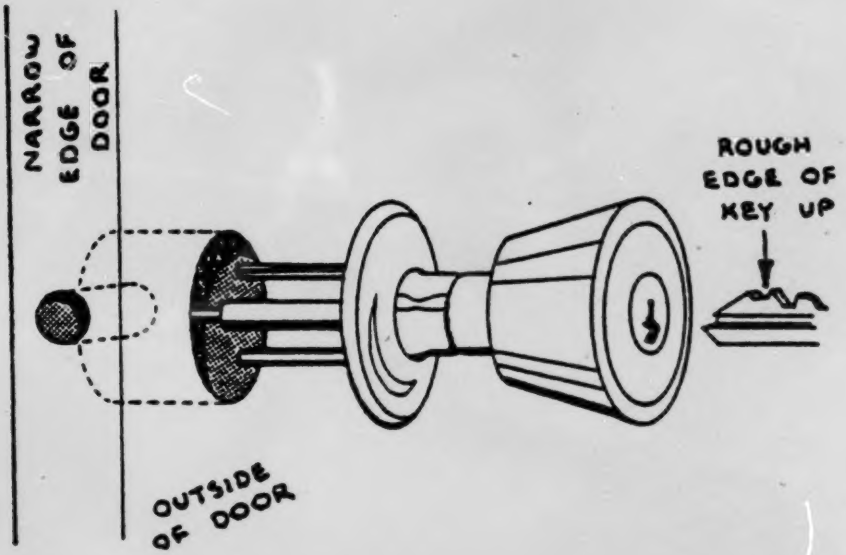


JOB STEPS

9. Tap the latch in until the collar is even with the door edge.

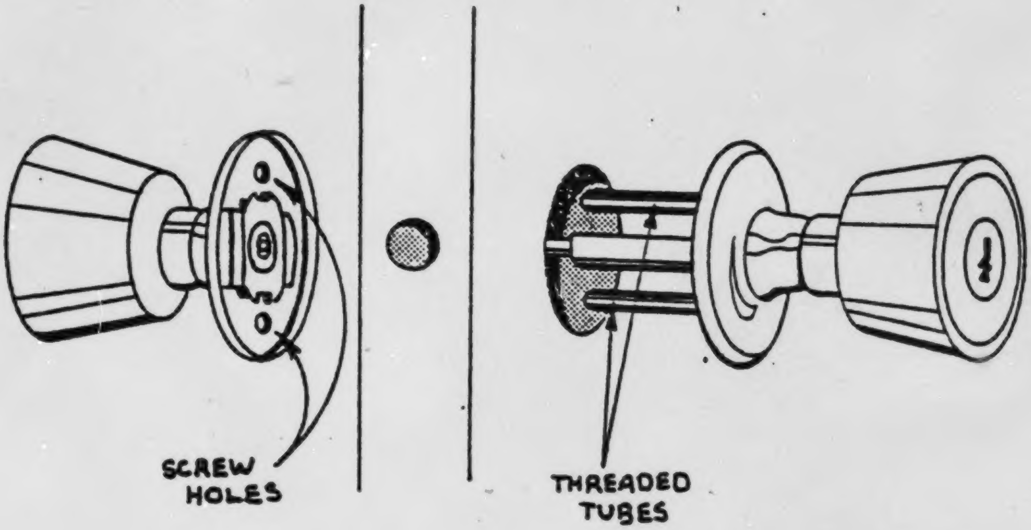

SQUARE HOLE

10. Push the knob with the square shaft through the backset hole from the outside of the door and through the square hole of the latch. The rough edge of the key should be up.


NARROW EDGE OF DOOR
ROUGH EDGE OF KEY UP
OUTSIDE OF DOOR

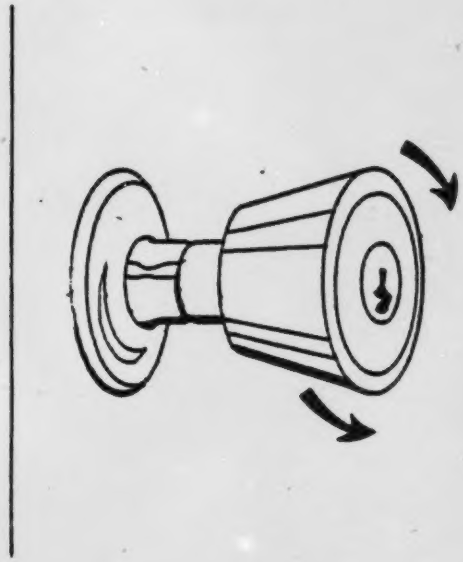
JOB STEPS

11. Place the other half of the knob through the backset hole -- from the inside of the door. The screw holes must line up with the threaded tubes of the other knob.



12. Place screws in the screw holes and tighten.

13. Check operation by turning knob in both directions. Knob should return to the center position without sticking.

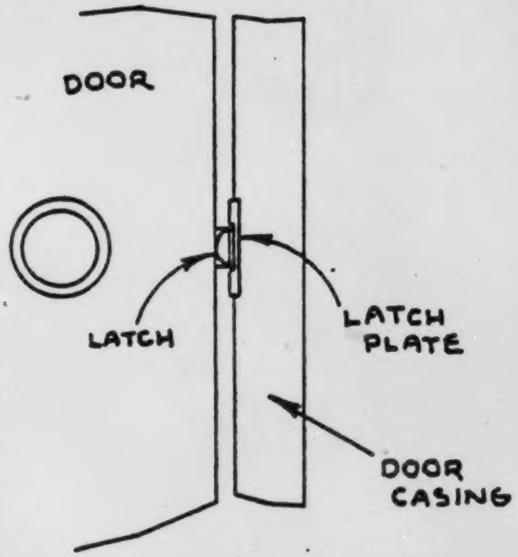


WORD GUIDE

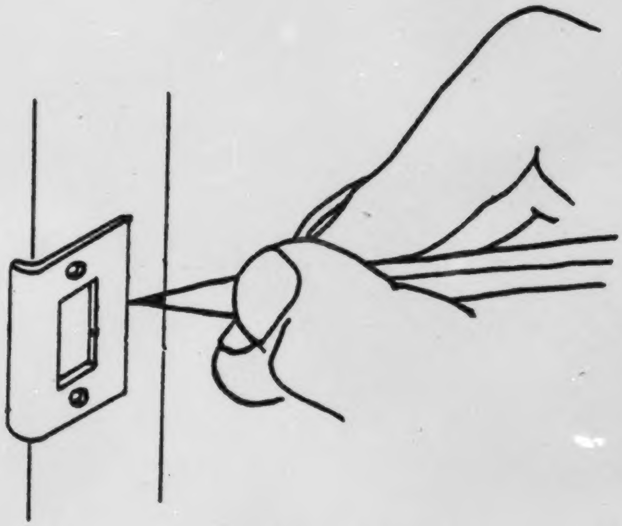
LATCH PLATE - part that the latch strikes as the door meets the casing.

JOB STEPS

14. Place latch plate on door casing -- curved edge to the inside so that the spring latch meets the hole in the plate dead center.

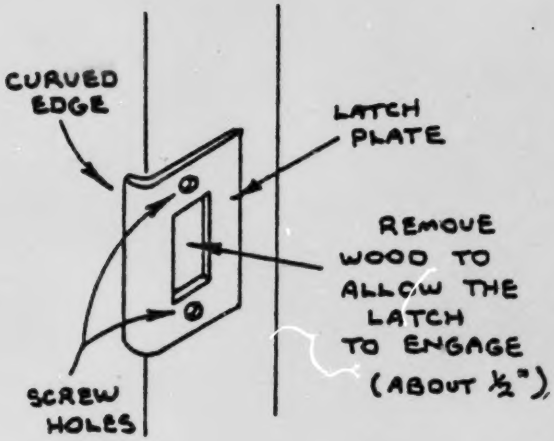


15. Trace around the latch plate. Remove enough wood with a hammer and wood chisel so latch plate fits flush with door casing.



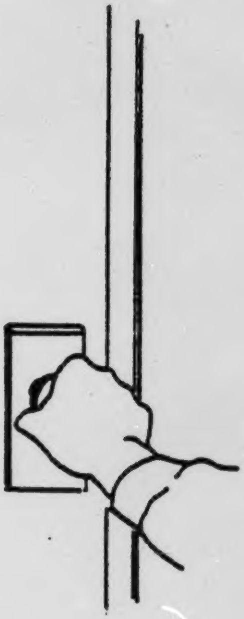
JOB STEPS

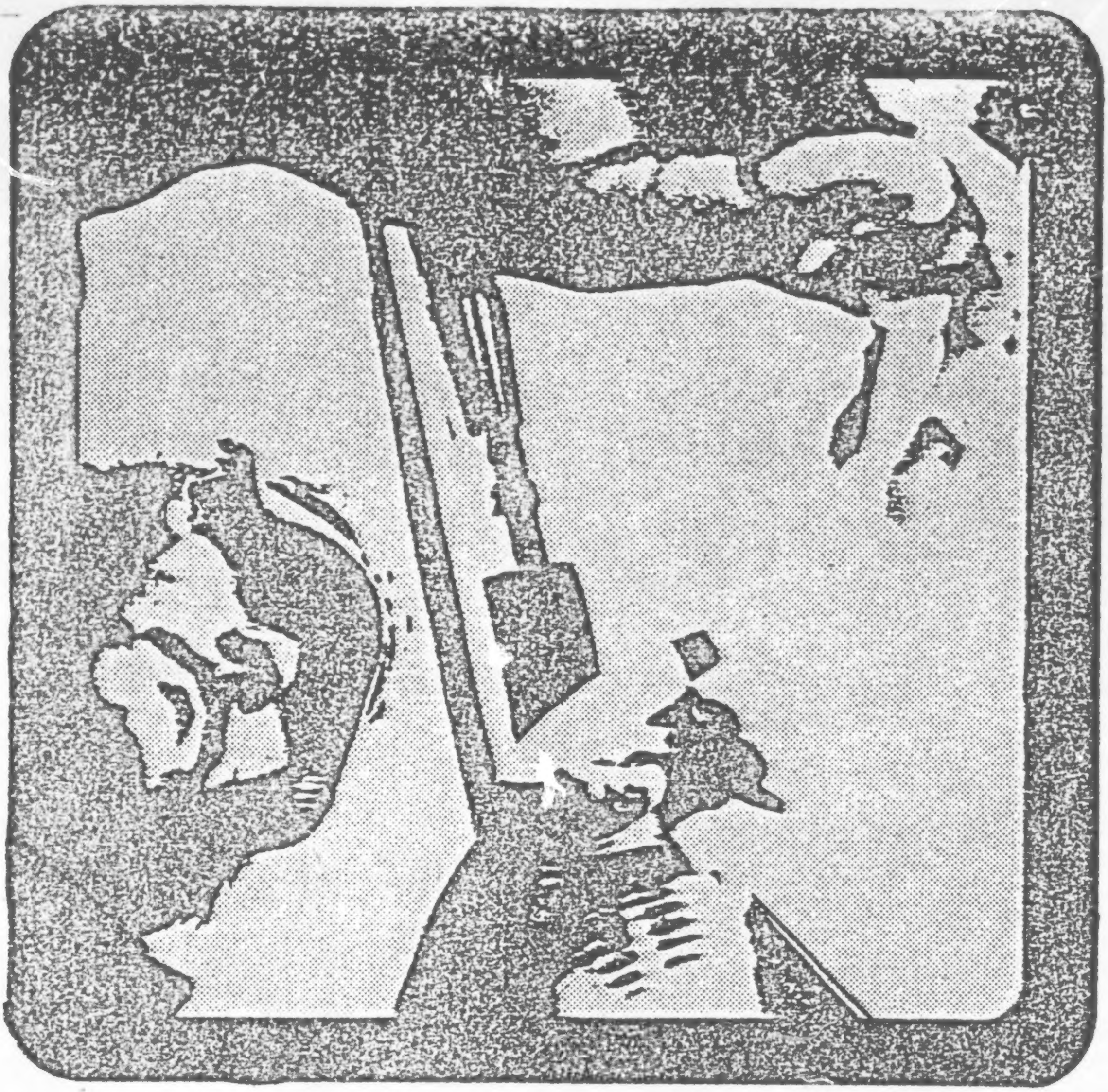
16. Place screws in the screw holes and tighten.


CURVED EDGE
LATCH PLATE
REMOVE WOOD TO ALLOW THE LATCH TO ENGAGE (ABOUT ½")
SCREW HOLES

17. Using the hammer and wood chisel, remove the wood from the latch plate hole to a depth of 1/2" so it receives the spring loaded latch.

18. Open and close the door to check for proper latching.





building maintenance & engineering

unit: Increase Production Speed

capital area career center

module: 2201 26 001 date: 6/77 level: IV

skill title: Build New Structures within a time limit plus 50%

developed & written by: Roy Haske

visuals by:

PERFORMANCE OBJECTIVE

You are going to learn:

How to build a new structure within a time limit plus 50%.

And in order to do this you will need:

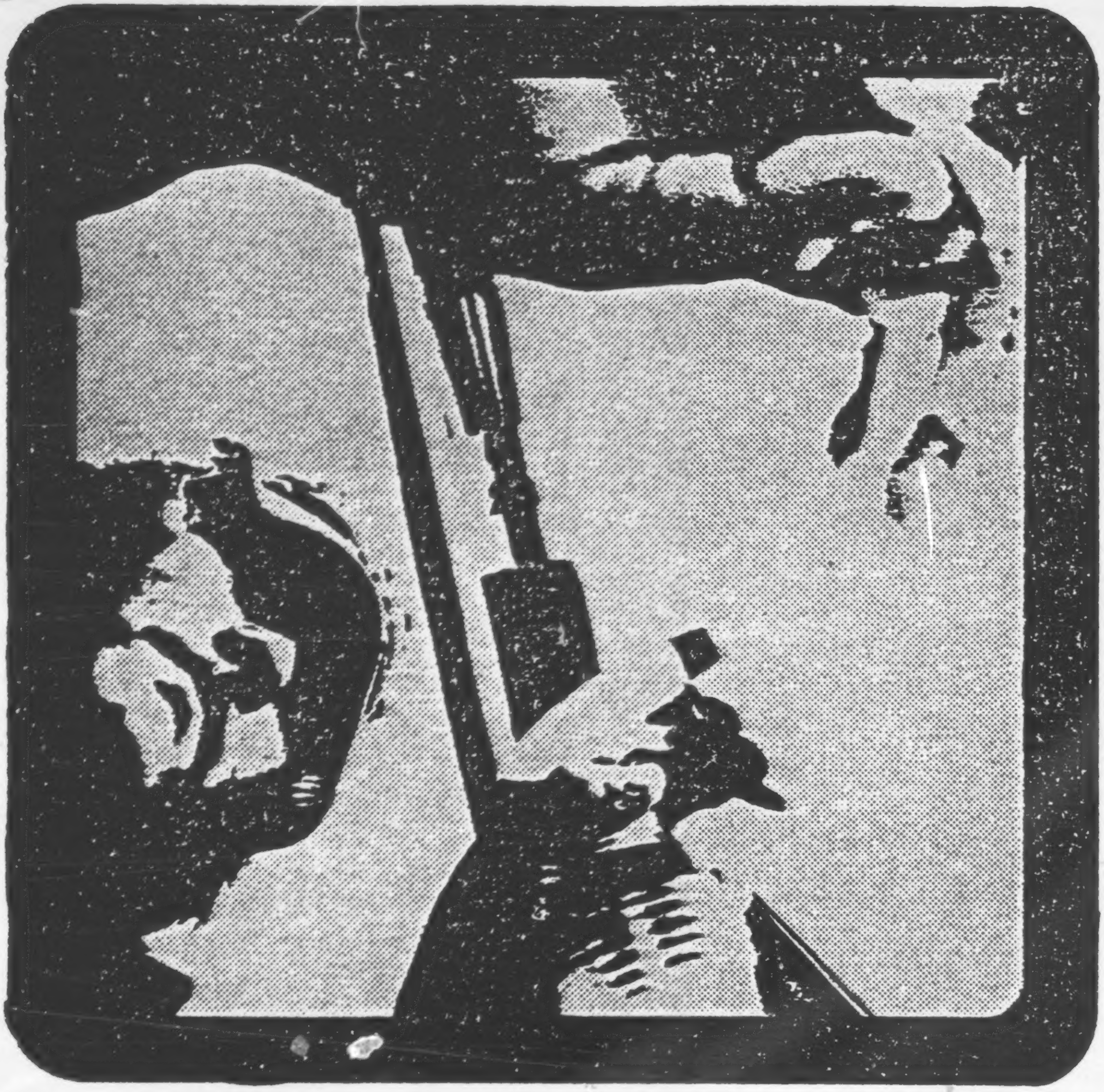
A job order for a structure.

We will know you can do it when:

You can follow the exact instructions given on the job order and do it within a time limit given by the instructor plus 50%.

INFORMATION

There are no specific job steps for this module. Your instructor will give you an assignment that must be completed within the time required on the Performance Objective.



building maintenance & engineering

unit: INCREASE PRODUCTION SPEED

capital area career center

module: 2201 26 002 date: 6/77 level: IV

skill title: Build New Structures Within A Time Limit Plus 25%

developed & written by: Roy Haske

visuals by:

PERFORMANCE OBJECTIVE

You are going to learn:

How to build a new structure within a time limit plus 25%.

And in order to do this you will need:

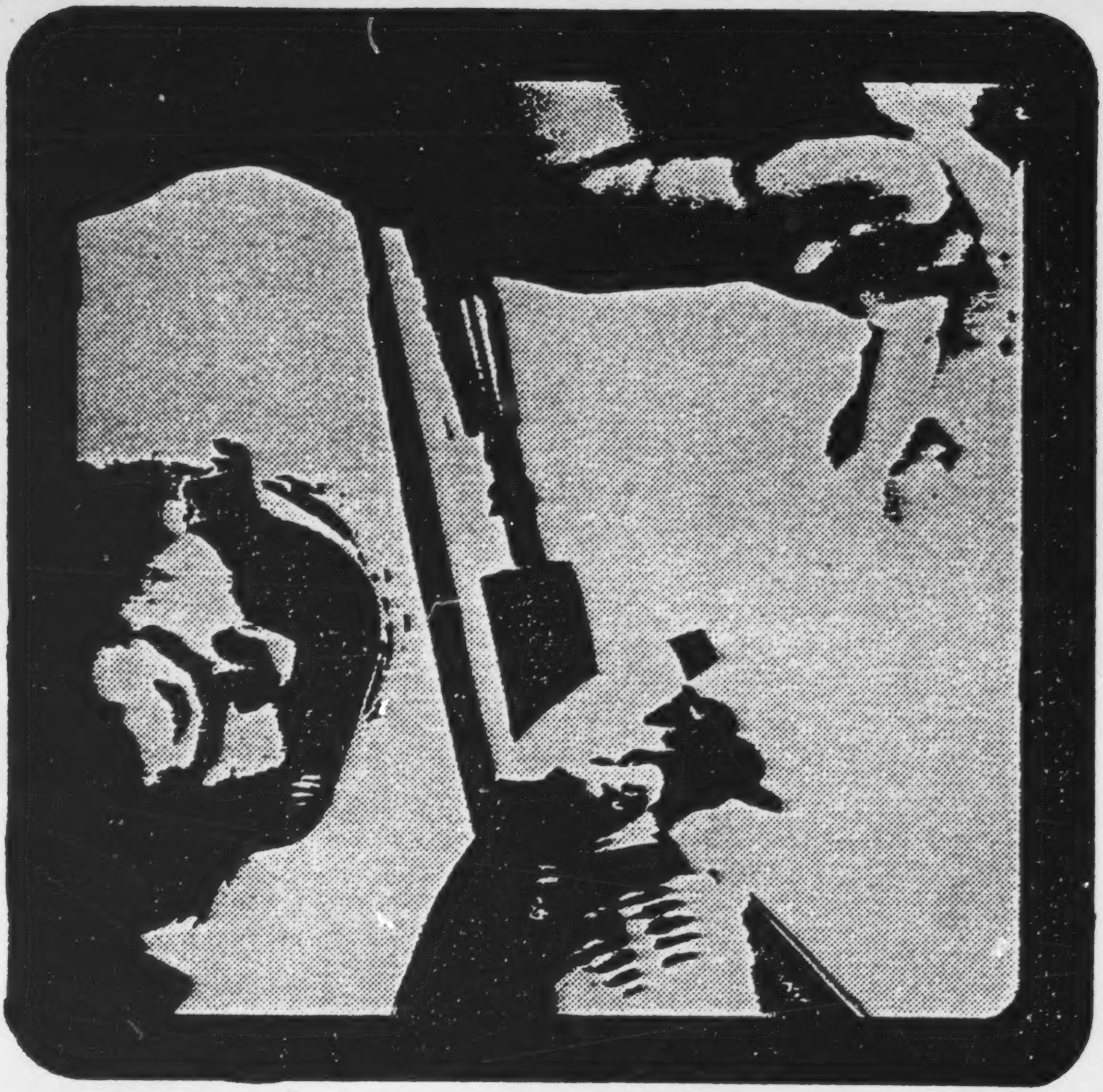
A job order for a new structure

We will know you can do this when:

You can follow the exact instructions given on the job order and do it within a time limit given by the instructor plus 25%.

INFORMATION

There are no specific job steps for this module. Your instructor will give you an assignment that must be completed within the time required on the Performance Objective page.



building maintenance & engineering

unit: Increase Production Speed

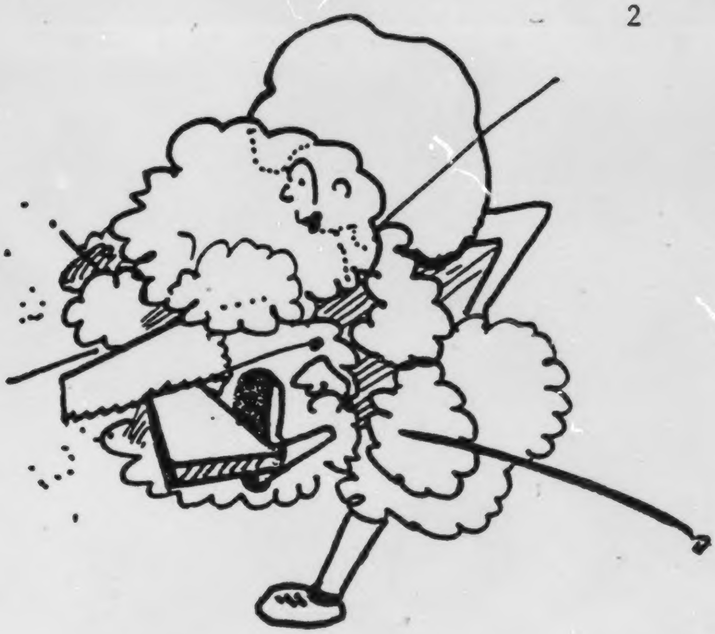
capital area career center

module: 2201 26 003 date: 6/77 level: IV

skill title: Build New Structure within a time limit

developed & written by: Roy Haske

visuals by:



PERFORMANCE OBJECTIVE

You are going to learn:

How to build a new structure within a time limit.

And in order to do this you will need:

A job order for a structure.

We will know you can do it when:

You can follow the exact instructions given on the job order and do it within a time limit given by the instructor.

INFORMATION

There are no specific job steps for this module. Your instructor will give you an assignment that must be completed within the time required on the Performance Objective.